H 5

```
   SSSSSSSSSSSS     000000000     RRRRRRRRRRRR     TTTTTTTTTTTTTTT     333333333        222222222
   SSSSSSSSSSSS     000000000     RRRRRRRRRRRR     TTTTTTTTTTTTTTT     333333333        222222222
   SSSSSSSSSSSS     000000000     RRRRRRRRRRRR     TTTTTTTTTTTTTTT     333333333        222222222
SSS              000         000  RRR         RRR        TTT        333         333  222         222
SSS              000         000  RRR         RRR        TTT        333         333  222         222
SSS              000         000  RRR         RRR        TTT        333         333  222         222
SSS              000         000  RRR         RRR        TTT                    333              222
SSS              000         000  RRR         RRR        TTT                    333              222
SSS              000         000  RRR         RRR        TTT                    333              222
   SSSSSSSSS     000         000  RRRRRRRRRRRR           TTT                 333              222
   SSSSSSSSS     000         000  RRRRRRRRRRRR           TTT                 333              222
   SSSSSSSSS     000         000  RRRRRRRRRRRR           TTT                 333              222
            SSS  000         000  RRR   RRR              TTT                    333        222
            SSS  000         000  RRR   RRR              TTT                    333        222
            SSS  000         000  RRR   RRR              TTT                    333        222
            SSS  000         000  RRR      RRR           TTT        333         333     222
            SSS  000         000  RRR      RRR           TTT        333         333     222
            SSS  000         000  RRR      RRR           TTT        333         333     222
SSSSSSSSSSSS        000000000     RRR         RRR        TTT           333333333     222222222222222
SSSSSSSSSSSS        000000000     RRR         RRR        TTT           333333333     222222222222222
SSSSSSSSSSSS        000000000     RRR         RRR        TTT           333333333     222222222222222
```

```
_$2

Pse
---
SOR

SOR

SOR

SOR

_LI
```

```
**FILE**ID**SORSPEC                                    E  9

  SSSSSSSS    000000    RRRRRRRR      SSSSSSSS  PPPPPPPP    EEEEEEEEEE    CCCCCCCC
  SSSSSSSS    000000    RRRRRRRR      SSSSSSSS  PPPPPPPP    EEEEEEEEEE    CCCCCCCC
SS          00      00  RR      RR  SS          PP      PP  EE          CC
SS          00      00  RR      RR  SS          PP      PP  EE          CC
SS          00      00  RR      RR  SS          PP      PP  EE          CC
SS          00      00  RR      RR  SS          PP      PP  EE          CC
  SSSSSS    00      00  RRRRRRRR      SSSSSS    PPPPPPPP    EEEEEEEE    CC
  SSSSSS    00      00  RRRRRRRR      SSSSSS    PPPPPPPP    EEEEEEEE    CC
        SS  00      00  RR  RR            SS  PP          EE          CC
        SS  00      00  RR  RR            SS  PP          EE          CC
        SS  00      00  RR    RR          SS  PP          EE          CC          ....
        SS  00      00  RR    RR          SS  PP          EE          CC          ....
SSSSSSSS      000000    RR      RR  SSSSSSSS    PP          EEEEEEEEEE    CCCCCCCC  ....
SSSSSSSS      000000    RR      RR  SSSSSSSS    PP          EEEEEEEEEE    CCCCCCCC  ....

LL            IIIIII      SSSSSSSS
LL            IIIIII      SSSSSSSS
LL              II      SS
LL              II      SS
LL              II      SS
LL              II      SS
LL              II        SSSSSS
LL              II        SSSSSS
LL              II              SS
LL              II              SS
LL              II              SS
LL              II              SS
LLLLLLLLLL    IIIIII    SSSSSSSS
LLLLLLLLLL    IIIIII    SSSSSSSS
```

SOR
V04

```
0 MODULE SOR$SPEC_FILE (
0               IDENT = 'V04-000'          ! File: SORSPEC.B32 Edit: PDG3030
0               ) =
1 BEGIN
1 !
1 !****************************************************************************
1 !*                                                                          *
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1 !*                                                                          *
1 !****************************************************************************
1 !
1
1 !++
1 !
1 ! FACILITY:     VAX-11 SORT/MERGE
1 !
1 ! ABSTRACT:
1 !
1 !       This module contains routines that read and process specification text.
1 !
1 ! ENVIRONMENT:  VAX/VMS user mode
1 !
1 ! AUTHOR: Peter D Gilbert, CREATION DATE: 07-Jan-1982
1 !
1 ! MODIFIED BY:
1 !
1 !       T03-015         Original
1 !       T03-016 Copy relevant information to RDT entries with same KFT indices.
1 !               Improve calculation of COM_FORMATS.  Comments.  PDG 13-Dec-1982
1 !       T03-017 Put a linkage declaration on SOR$$COMPARE.  PDG-15-Dec-1982
1 !       T03-018 Define offsets for use by SOR$$COMPARE.  PDG 22-Dec-1982
1 !       T03-019 Check for a longword temporary (not CTX[COM_LRL_INT) exceeding
1 !               MAX_REFSIZE.  PDG 28-Dec-1982
1 !       T03-020 Added the output format record length as an output parameter
1 !               from SOR$$REFORM.  PDG 3-Jan-1983
1 !       T03-021 Added clean-up routine for the work area.  PDG 26-Jan-1983
1 !       T03-022 Use COM_MRG_STREAM for stable merges.  PDG 27-Jan-1983
1 !       T03-023 Define COM$B_PAD for use by SOR$$COMPARE.  PDG 8-Feb-1983
1 !       T03-024 Abort on errors from SOR$$SFPRS.  Use KFT_NDE_SIZ.
1 !               Pass the context address to callback routines.  PDG 12-Feb-1983
```

```
1 !             T03-025 Use SOR$$(DE)ALLOCATE to append code strings.  PDG 7-Mar-1983
1 !             T03-026 Special-case some stuff to use SOR$$KEY_SUB.  PDG 17-Mar-1983
1 !             T03-027 Correctly set the COM_VAR flag.  PDG 9-May-1983
1 !             T03-028 Fix adding DSC_ADR to COM_COMPARE.  Make allowances for ADDRESS
1 !                     and INDEX sorts.  PDG 10-May-1983
1 !             T03-029 Leave COM_EQUAL equal to 0 if it's not needed.  PDG 26-Aug-1983
1 !             T03-030 SOR$$BEST_FILE_NAME assumes NAM$B_RSL and NAM$B_ESL are zero
1 !                     before the OPEN or CREATE.  PDG 10-Nov-1983
1 !--
```

```
;    68        0067   1 LIBRARY 'SYS$LIBRARY:STARLET';
;    69        0068   1 REQUIRE 'SRC$:COM';
;    70        0138   1 LIBRARY 'SRC$:SRTSPC';
;    71        0139   1 LIBRARY 'SRC$:OPCODES';
;    72        0140   1
;    73        0141   1 !%IF %DECLARED(%QUOTE $DESCRIPTOR) %THEN UNDECLARE %QUOTE $DESCRIPTOR; %FI
;    74        0142   1
;    75        0143   1 FORWARD ROUTINE
;    76        0144   1     SOR$$SPEC_FILE:     CAL_CTXREG,               ! Process specification text
;    77        0145   1     CALC_LRL_OUT:       CAL_CTXREG NOVALUE,       ! Spec file processing for LRL
;    78        0146   1     SOR$$SPEC_KEY_SUB:  CAL_CTXREG,               ! Process keys for spec file
;    79        0147   1     INPUT:              JSB_INPUT,                ! General input routine
;    80        0148   1     COMPARE:            JSB_COMPARE,              ! General compare routine
;    81        0149   1     SOR$$COMPATIBLE:    CAL_CTXREG,               ! Test keys for compatibility
;    82        0150   1     CLEAN_UP:           CAL_CTXREG NOVALUE;       ! Release resources
;    83        0151   1
;    84        0152   1 SOR$$END_ROUTINE_(CLEAN_UP);                      ! Declare a clean-up routine
;    85        0153   1
;    86        0154   1 EXTERNAL ROUTINE
;    87        0155   1     LIB$SFREE1_DD:      ADDRESSING_MODE(GENERAL),         ! Free a dynamic string
;    88        0156   1     LIB$GET_VM:         ADDRESSING_MODE(GENERAL),         ! Get virtual memory
;    89        0157   1     STR$APPEND:         ADDRESSING_MODE(GENERAL),         ! Append strings
;    90        0158   1     SOR$$SFPRS:         CAL_CTXREG,                       ! Parse specifications
;    91        0159   1     SOR$$BEST_FILE_NAME:CAL_CTXREG NOVALUE,               ! Get best file name string
;    92        0160   1     SOR$$ALLOCATE:      CAL_CTXREG,                       ! Allocate storage
;    93        0161   1     SOR$$DEALLOCATE:    CAL_CTXREG NOVALUE,               ! Deallocate storage
;    94        0162   1     SOR$$KEY_SUB:       CAL_CTXREG,                       ! Generate routines
;    95        0163   1     SOR$$ERROR;                                           ! Error routine
;    96        0164   1
;    97        0165   1 ! Define offsets within the internal format record
;    98        0166   1 !
;    99        0167   1 LITERAL
;   100        0168   1     OFF_STAB=   0,      ! Offset to the stable information       (long)
;   101        0169   1     OFF_FMT=    4,      ! Offset to the format number            (byte)
;   102        0170   1     OFF_LEN=    5,      ! Offset to the record length            (word)
;   103        0171   1     OFF_ADR=    7;      ! Offset to the data portion of the record
;   104        0172   1
;   105        0173   1 ! Define offsets for use by SOR$$COMPARE.
;   106        0174   1 !
;   107        0175   1 BIND ZIP_CTX = 0:       BLOCK[CTX_K_SIZE] FIELD(CTX_FIELDS);
;   108        0176   1 GLOBAL LITERAL
;   109        0177   1     COM$L_COLLATE=      ZIP_CTX[COM_COLLATE],
;   110        0178   1     COM$B_PAD=          ZIP_CTX[COM_PAD];
```

```
  1 GLOBAL ROUTINE SOR$$SPEC_FILE: CAL_CTXREG =
  1
  1 !++
  1 !
  1 ! FUNCTIONAL DESCRIPTION:
  1 !
  1 !       This routine processes the specification text.
  1 !
  1 ! FORMAL PARAMETERS:
  1 !
  1 !       NONE
  1 !
  1 ! IMPLICIT INPUTS:
  1 !
  1 !       NONE
  1 !
  1 ! IMPLICIT OUTPUTS:
  1 !
  1 !       NONE
  1 !
  1 ! ROUTINE VALUE:
  1 !
  1 !       Status code.
  1 !
  1 ! SIDE EFFECTS:
  1 !
  1 !       NONE
  1 !
  1 !--
  2     BEGIN
  2     EXTERNAL REGISTER
  2         CTX =   COM_REG_CTX:    REF BLOCK[CTX_K_SIZE]
  2                                 FIELD(CTX_FIE[DS);
  2     LOCAL
  2         FAB:    $FAB_DECL,              ! FAB block
  2         NAM:    $NAM_DECL VOLATILE,     ! NAM block
  2         RAB:    REF $RAB_DECL,          ! RAB block
  2         DDB:    REF DDB_BLOCK,
  2         FNA:    BLOCK[NAM$C_MAXRSS, BYTE],      ! File name string area
  2         BUF:    VECTOR[MAX_SPC_LINE,BYTE],      ! Buffer area
  2         DESC:   BLOCK[8,BYTE],                  ! Dynamic string descriptor
  2         STATUS;                 ! Status
  2
  2
  2     ! Initialize the FAB (file access block) and the NAM (name block)
  2     !
P 2     $FAB_INIT(
P 2         FAB = FAB[BASE_],               ! FAB block
P 2         NAM = NAM[BASE_],               ! NAM block
P 2 !       FNA                             ! File name area        (set below)
P 2 !       FNS                             ! File name area size   (set below)
P 2         FAC = GET,                      ! File access
P 2         SHR = GET,                      ! Sharing
P 2         DNA = UPLIT BYTE(STR_SPC_EXT),  ! Default extension is .SRT
P 2         DNS = %CHARCOUNT(STR_SPC_EXT),  ! Default extension is .SRT
P 2         RFM = VAR,                      ! Needed if no input files
  2         RAT = CR);                      ! Record attributes
```

```
$NAM_INIT(
    NAM = NAM[BASE_],                   ! NAM block
    ESS = %ALLOCATION(FNA),             ! Expanded name string size
    ESA = FNA[BASE_],                   ! Expanded name string area
    RSS = %ALLOCATION(FNA),             ! Resultant name string size
    RSA = FNA[BASE_]);                  ! Resultant name string area


! Initialize a dynamic string descriptor for the text
!
DESC[DSC$W_LENGTH] = 0;
DESC[DSC$B_DTYPE] = DSC$K_DTYPE_T;
DESC[DSC$B_CLASS] = DSC$K_CLASS_D;
DESC[DSC$A_POINTER] = 0;


! Loop for each input file
!
DDB = .CTX[COM_SPC_DDB];                             ! Point to first DDB
WHILE DDB[BASE_] NEQ 0 DO
    BEGIN

    ! Actually open the input file
    !
    NAM[NAM$B_RSL] = 0;
    NAM[NAM$B_ESL] = 0;
    FAB[FAB$W_IFI] = 0;
    BEGIN
    SWITCHES STRUCTURE(BLOCK[,BYTE]);
    FAB[FAB$B_FNS] = .DDB[DDB_NAME][DSC$W_LENGTH];
    FAB[FAB$L_FNA] = .DDB[DDB_NAME][DSC$A_POINTER];
    END;
    STATUS = $OPEN(FAB = FAB[BASE_]);


    ! Get the best file name string available into NAM$B_RSL/NAM$L_RSA
    !
    SOR$$BEST_FILE_NAME(FAB[BASE_], DDB[DDB_NAME]);

    IF NOT .FAB[FAB$L_STS]
    THEN
        RETURN SOR$$ERROR(SOR$_SHR_OPENIN, 1, DDB[DDB_NAME],
                .FAB[FAB$L_STS], .FAB[FAB$L_STV]);

    ! Connect to the FAB
    !
    RAB = DDB[DDB_RAB+BASE_];
    $RAB_INIT(
        RAB = RAB[BASE_],
        FAB = FAB[BASE_],
        RAC = SEQ,
        USZ = %ALLOCATION(BUF),
        UBF = BUF,
        ROP = <RAH,LOC,MAS>);

    STATUS = $CONNECT(RAB = RAB[BASE_]);
    IF NOT .STATUS
```

```
THEN
    RETURN SOR$$ERROR(SOR$_SHR_OPENOUT, 1, DDB[DDB_NAME],
            .RAB[RAB$L_STS], .RAB[RAB$L_STV]);

! Read all the records from the file
!
WHILE TRUE DO
    BEGIN

    IF (STATUS = $GET(RAB = RAB[BASE_]))
    THEN
        BEGIN
        LOCAL
            D:  VECTOR[2];                  ! Descriptor

        ! Append the record and a null to the string
        !
        D[0] = .RAB[RAB$W_RSZ];
        D[1] = .RAB[RAB$L_RBF];
        DECR I FROM 1 TO 0 DO
            BEGIN
            STATUS = STR$APPEND(DESC[BASE_], D[0]);
            IF NOT .STATUS
            THEN
                RETURN SOR$$ERROR(SOR$_SHR_SYSERROR, 0, .STATUS);
            D[0] = 1;
            D[1] = UPLIT BYTE(0);
            END;
        END
    ELIF
        .STATUS EQL RMS$_RSA                ! Record Stream Active
    THEN
        $WAIT(RAB=RAB[BASE_])               ! Wait until not so active
    ELSE
        EXITLOOP;                           ! Some other error
    END;

! Check for the expected status
!
IF .STATUS NEQ RMS$_EOF
THEN
    SOR$$ERROR(SOR$_SHR_READERR, 1, DDB[DDB_NAME],
            .RAB[RAB$L_STS], .RAB[RAB$L_STV]);

! All records have been read from this file, so close it.
! Zero the IFI in the DDB, so we know that this file is closed
!
IF NOT $CLOSE(FAB=FAB[BASE_])
THEN
    SOR$$ERROR(SOR$_SHR_CLOSEIN, 1, DDB[DDB_NAME],
            .FAB[FAB$L_STS], .FAB[FAB$L_STV]);
DDB[DDB_IFI] = 0;

! Advance to the next file
```

SOR
V04

D9

; R

```
            !
            DDB = .DDB[DDB_NEXT];
            END;

        ! Append any other text to the buffer
        !
        STATUS = STR$APPEND(DESC[BASE_], CTX[COM_SPC_TXT]);
        IF NOT .STATUS THEN RETURN SOR$$ERROR(SOR$_SHR_SYSERROR, 0, .STATUS);

        ! Allocate a work area to hold the tables produced by SOR$$SFPRS
        !
        IF .CTX[COM_WRK_ADR] EQL 0
        THEN
            BEGIN
            CTX[COM_WRK_SIZ] = WRK_K_ALLOC;
            STATUS = LIB$GET_VM(CTX[COM_WRK_SIZ], CTX[COM_WRK_ADR]);
            IF NOT .STATUS THEN SOR$$ERROR(SOR$_SHR_SYSERROR, 0, .STATUS);
            CTX[COM_WRK_END] = .CTX[COM_WRK_ADR] + .CTX[COM_WRK_SIZ];
            END;

        ! Call SOR$$SFPRS to build the tables
        !
        BEGIN
        LOCAL D: VECTOR[2];             ! Descriptor
        D[0] = .DESC[DSC$W_LENGTH];
        D[1] = .DESC[DSC$A_POINTER];
        STATUS = SOR$$SFPRS(D[0]);
        IF NOT .STATUS
        THEN
            RETURN SOR$$FATAL(.STATUS);
        END;

        ! Free the dynamic strings
        !
        STATUS = LIB$SFREE1_DD(DESC[BASE_]);          ! Free the string
        IF NOT .STATUS THEN SOR$$ERROR(SOR$_SHR_SYSERROR, 0, .STATUS);
        STATUS = LIB$SFREE1_DD(CTX[COM_SPC_TXT]);     ! Free the string
        IF NOT .STATUS THEN SOR$$ERROR(SOR$_SHR_SYSERROR, 0, .STATUS);

        RETURN SS$_NORMAL;
        END;

                                                  .TITLE  SOR$SPEC_FILE
                                                  .IDENT  \V04-000\

                                                  .PSECT  SOR$RO_CODE_________________2,NOWRT,  SHR,  PIC,

                              00000000V 00000 _CLEAN_UP:
                                                  .LONG   <CLEAN_UP-_CLEAN_UP>                              ;

                                                  .PSECT  SOR$RO_CODE,NOWRT,  SHR,  PIC,2
```

```
SOR$SPEC_FILE                                            M  9
V04-000                                            16-Sep-1984 00:51:10    VAX-11 Bliss-32 V4.0-742             Page   8
                                                   14-Sep-1984 13:10:51    [SORT32.SRC]SORSPEC.B32;1                  (3)

                          54  52  53  2E  00000 P.AAA:  .ASCII  \.SRT\                                            ;
                                      00  00004 P.AAB:  .BYTE   0                                                 ;

                                                ZIP_CTX=            0
                                                COM$L_COLLATE==     104
                                                COM$B_PAD==         257
                                                        .EXTRN  LIB$SFREE1_DD, LIB$GET_VM
                                                        .EXTRN  STR$APPEND, SOR$$SFPRS
                                                        .EXTRN  SOR$$BEST_FILE_NAME
                                                        .EXTRN  SOR$$ALLOCATE, SOR$$DEALLOCATE
                                                        .EXTRN  SOR$$KEY_SUB, SOR$$ERROR
                                                        .EXTRN  SYS$OPEN, SYS$CONNECT
                                                        .EXTRN  SYS$GET, SYS$WAIT
                                                        .EXTRN  SYS$CLOSE

                                    07FC  00000         .ENTRY  SOR$$SPEC_FILE, Save R2,R3,R4,R5,R6,R7,R8,-   ; 0179
                                                                R9,R10                                        ;
                   5A 00000000G  00  9E  00002          MOVAB   SOR$$ERROR, R10                               ;
                   5E       FDBC  CE  9E  00009          MOVAB   -580(SP), SP                                  ;
  0050   8F          00    6E       00  2C  0000E          MOVC5   #0, (SP), #0, #80, $RMS_PTR                   ; 0235
                                 B0  AD      00015                                                            ;
             B0    AD       5003  8F  B0  00017          MOVW    #20483, $RMS_PTR                              ;
             C6    AD       0202  8F  B0  0001D          MOVW    #514, $RMS_PTR+22                             ;
             CE    AD       0202  8F  B0  00023          MOVW    #514, $RMS_PTR+30                             ;
             D8    AD       FF50  CD  9E  00029          MOVAB   NAM, $RMS_PTR+40                              ;
             E0    AD         C9  AF  9E  0002F          MOVAB   P.AAA, $RMS_PTR+48                            ;
             E5    AD             04  90  00034          MOVB    #4, $RMS_PTR+53                               ;
  0060   8F          00    6E       00  2C  00038          MOVC5   #0, (SP), #0, #96, $RMS_PTR                   ; 0241
                               FF50  CD      0003F                                                            ;
           FF50    CD       6002  8F  B0  00042          MOVW    #24578, $RMS_PTR                              ;
           FF52    CD             01  8E  00049          MNEGB   #1, $RMS_PTR+2                                ;
           FF54    CD       0094  CE  9E  0004E          MOVAB   FNA, $RMS_PTR+4                               ;
           FF5A    CD             01  8E  00055          MNEGB   #1, $RMS_PTR+10                               ;
           FF5C    CD       0094  CE  9E  0005A          MOVAB   FNA, $RMS_PTR+12                              ;
             08    AE  020E0000  8F  D0  00061          MOVL    #34471936, DESC                               ; 0246
                              0C  AE  D4  00069          CLRL    DESC+4                                        ; 0249
                   57       00AC  CB  D0  0006C          MOVL    172(CTX), DDB                                 ; 0254
                                  03  12  00071 1$:      BNEQ    2$                                            ; 0255
                           0121  31      00073          BRW     11$                                           ;
                           FF53  CD  94  00076 2$:      CLRB    NAM+3                                         ; 0260
                           FF5B  CD  94  0007A          CLRB    NAM+11                                        ; 0261
                             B2  AD  B4  0007E          CLRW    FAB+2                                         ; 0262
                   58         04  A7  9E  00081          MOVAB   4(DDB), R8                                    ; 0265
             E4    AD             68  90  00085          MOVB    (R8), FAB+52                                  ;
             DC    AD         04  A8  D0  00089          MOVL    4(R8), FAB+44                                 ; 0266
                             B0  AD  9F  0008E          PUSHAB  FAB                                           ; 0268
        00000000G  00             01  FB  00091          CALLS   #1, SYS$OPEN                                  ;
                   59             50  D0  00098          MOVL    R0, STATUS                                    ;
                                  58  DD  0009B          PUSHL   R8                                            ; 0273
                             B0  AD  9F  0009D          PUSHAB  FAB                                           ;
        00000000G  00             02  FB  000A0          CALLS   #2, SOR$$BEST_FILE_NAME                       ;
                   10         B8  AD  E8  000A7          BLBS    FAB+8, 3$                                     ; 0275
                   7E         B8  AD  7D  000AB          MOVQ    FAB+8, -(SP)                                  ; 0278
                                  58  DD  000AF          PUSHL   R8                                            ; 0277
                                  01  DD  000B1          PUSHL   #1                                            ;
                       001C109C  8F  DD  000B3          PUSHL   #1839260                                      ;
                                  48  11  000B9          BRB     4$                                            ;
                          56        14  A7  9E 000BB 3$:   MOVAB   20(R7), RAB                          ; 0282
  0044   8F           00  6E            00  2C 000BF       MOVC5   #0, (SP), #0, #68, (RAB)             ; 0289
                                        66     000C6                                                    ;
                          66      4401  8F  B0 000C7       MOVW    #17409, (RAB)                        ;
                    04    A6  00010220  8F  D0 000CC       MOVL    #66080, 4(RAB)                       ;
                                    1E  A6  94 000D4       CLRB    30(RAB)                              ;
                    20    A6        84  8F  9B 000D7       MOVZBW  #132, 32(RAB)                        ;
                    24    A6        10  AE  9E 000DC       MOVAB   BUF, 36(RAB)                         ;
                    3C    A6        B0  AD  9E 000E1       MOVAB   FAB, 60(RAB)                         ;
                                        56  DD 000E6       PUSHL   RAB                                  ; 0291
             00000000G    00            01  FB 000E8       CALLS   #1, SYS$CONNECT                      ;
                          59            50  D0 000EF       MOVL    R0, STATUS                           ;
                          12            59  E8 000F2       BLBS    STATUS, 5$                           ; 0292
                          7E        08  A6  7D 000F5       MOVQ    8(RAB), -(SP)                        ; 0295
                                        58  DD 000F9       PUSHL   R8                                   ; 0294
                                        01  DD 000FB       PUSHL   #1                                   ;
                              001C10A4  8F  DD 000FD       PUSHL   #1839268                             ;
                          6A            05  FB 00103 4$:   CALLS   #5, SOR$$ERROR                       ;
                                            04 00106       RET                                          ;
                                        56  DD 00107 5$:   PUSHL   RAB                                  ; 0302
             00000000G    00            01  FB 00109       CALLS   #1, SYS$GET                          ;
                          59            50  D0 00110       MOVL    R0, STATUS                           ;
                          2C            59  E9 00113       BLBC    STATUS, 7$                           ;
                          6E        22  A6  3C 00116       MOVZWL  34(RAB), D                           ; 0310
                    04    AE        28  A6  D0 0011A       MOVL    40(RAB), D+4                         ; 0311
                          52            01  D0 0011F       MOVL    #1, I                                ; 0312
                                        5E  DD 00122 6$:   PUSHL   SP                                   ; 0314
                                    0C  AE  9F 00124       PUSHAB  DESC                                 ;
             00000000G    00            02  FB 00127       CALLS   #2, STR$APPEND                       ;
                          59            50  D0 0012E       MOVL    R0, STATUS                           ;
                          77            59  E9 00131       BLBC    STATUS, 12$                          ; 0315
                          6E            01  D0 00134       MOVL    #1, D                                ; 0318
                    04    AE      FEC4  CF  9E 00137       MOVAB   P.AAB, D+4                           ; 0319
                          E2            52  F4 0013D       SOBGEQ  I, 6$                                ; 0312
                                        C5  11 00140       BRB     5$                                   ; 0302
             000182DA     8F            59  D1 00142 7$:   CMPL    STATUS, #99034                       ; 0323
                                        0B  12 00149       BNEQ    8$                                   ;
                                        56  DD 0014B       PUSHL   RAB                                  ; 0325
             00000000G    00            01  FB 0014D       CALLS   #1, SYS$WAIT                         ;
                                        B1  11 00154       BRB     5$                                   ;
             0001827A     8F            59  D1 00156 8$:   CMPL    STATUS, #98938                       ; 0333
                                        11  13 0015D       BEQL    9$                                   ;
                          7E        08  A6  7D 0015F       MOVQ    8(RAB), -(SP)                        ; 0336
                                        58  DD 00163       PUSHL   R8                                   ; 0335
                                        01  DD 00165       PUSHL   #1                                   ;
                              001C10B2  8F  DD 00167       PUSHL   #1839282                             ;
                          6A            05  FB 0016D       CALLS   #5, SOR$$ERROR                       ;
                                    B0  AD  9F 00170 9$:   PUSHAB  FAB                                  ; 0342
             00000000G    00            01  FB 00173       CALLS   #1, SYS$CLOSE                        ;
                          11            50  E8 0017A       BLBS    R0, 10$                              ;
                          7E        B8  AD  7D 0017D       MOVQ    FAB+8, -(SP)                         ; 0345
                                        58  DD 00181       PUSHL   R8                                   ; 0344
                                        01  DD 00183       PUSHL   #1                                   ;
                              001C1052  8F  DD 00185       PUSHL   #1839186                             ;
                          6A            05  FB 0018B       CALLS   #5, SOR$$ERROR                       ;
                                    0C  A7  D4 0018E 10$:  CLRL    12(DDB)                              ; 0346
                          57            67  D0 00191       MOVL    (DDB), DDB                           ; 0351
```

```
SOR$SPEC_FILE                                            B 10
V04-000                                       16-Sep-1984 00:51:10    VAX-11 Bliss-32 V4.0-742          Page  10
                                              14-Sep-1984 13:10:51    [SORT32.SRC]SORSPEC.B32;1               (3)

                                                   FEDA 31 00194       BRW     1$                                  ; 0255
                                               00F4  CB 9F 00197 11$:  PUSHAB  244(CTX)                            ; 0357
                                                 0C  AE 9F 0019B       PUSHAB  DESC                                ;
                            00000000G  00            02 FB 0019E       CALLS   #2, STR$APPEND                      ;
                                       59            50 D0 001A5       MOVL    R0, STATUS                          ;
                                       0E            59 E8 001A8       BLBS    STATUS, 13$                         ; 0358
                                                     59 DD 001AB 12$:  PUSHL   STATUS                              ;
                                                     7E D4 001AD       CLRL    -(SP)                               ;
                                           001C11B4  8F DD 001AF       PUSHL   #1839540                            ;
                                       6A            03 FB 001B5       CALLS   #3, SOR$$ERROR                      ;
                                                        04 001B8       RET                                         ;
                                       53      0128  CB 9E 001B9 13$:  MOVAB   296(CTX), R3                        ; 0363
                                                     63 D5 001BE       TSTL    (R3)                                ;
                                                     2E 12 001C0       BNEQ    15$                                 ;
                                       52      0124  CB 9E 001C2       MOVAB   292(CTX), R2                        ; 0366
                                       62  00010000  8F D0 001C7       MOVL    #65536, (R2)                        ;
                                                     0C BB 001CE       PUSHR   #^M<R2,R3>                          ; 0367
                            00000000G  00            02 FB 001D0       CALLS   #2, LIB$GET_VM                      ;
                                       59            50 D0 001D7       MOVL    R0, STATUS                          ;
                                       0D            59 E8 001DA       BLBS    STATUS, 14$                         ; 0368
                                                     59 DD 001DD       PUSHL   STATUS                              ;
                                                     7E D4 001DF       CLRL    -(SP)                               ;
                                           001C11B4  8F DD 001E1       PUSHL   #1839540                            ;
                                       6A            03 FB 001E7       CALLS   #3, SOR$$ERROR                      ;
                   012C  CB                63            62 C1 001EA 14$:  ADDL3   (R2), (R3), 300(CTX)            ; 0369
                                       6E        08  AE 3C 001F0 15$:  MOVZWL  DESC, D                             ; 0377
                                   04  AE        0C  AE D0 001F4       MOVL    DESC+4, D+4                         ; 0378
                                                     5E DD 001F9       PUSHL   SP                                  ; 0379
                            00000000G  00            01 FB 001FB       CALLS   #1, SOR$$SFPRS                      ;
                                       59            50 D0 00202       MOVL    R0, STATUS                          ;
                                       0C            59 E8 00205       BLBS    STATUS, 16$                         ; 0380
                         50            59            07 CB 00208       BICL3   #7, STATUS, R0                      ; 0382
                         7E            50            04 C9 0020C       BISL3   #4, R0, -(SP)                       ;
                                       6A            01 FB 00210       CALLS   #1, SOR$$ERROR                      ;
                                                        04 00213       RET                                         ;
                                                 08  AE 9F 00214 16$:  PUSHAB  DESC                                ; 0388
                            00000000G  00            01 FB 00217       CALLS   #1, LIB$SFREE1_DD                   ;
                                       59            50 D0 0021E       MOVL    R0, STATUS                          ;
                                       0D            59 E8 00221       BLBS    STATUS, 17$                         ; 0389
                                                     59 DD 00224       PUSHL   STATUS                              ;
                                                     7E D4 00226       CLRL    -(SP)                               ;
                                           001C11B4  8F DD 00228       PUSHL   #1839540                            ;
                                       6A            03 FB 0022E       CALLS   #3, SOR$$ERROR                      ;
                                               00F4  CB 9F 00231 17$:  PUSHAB  244(CTX)                            ; 0390
                            00000000G  00            01 FB 00235       CALLS   #1, LIB$SFREE1_DD                   ;
                                       59            50 D0 0023C       MOVL    R0, STATUS                          ;
                                       0D            59 E8 0023F       BLBS    STATUS, 18$                         ; 0391
                                                     59 DD 00242       PUSHL   STATUS                              ;
                                                     7E D4 00244       CLRL    -(SP)                               ;
                                           001C11B4  8F DD 00246       PUSHL   #1839540                            ;
                                       6A            03 FB 0024C       CALLS   #3, SOR$$ERROR                      ;
                                       50            01 D0 0024F 18$:  MOVL    #1, R0                              ; 0393
                                                        04 00252       RET                                         ; 0394

; Routine Size:  595 bytes,    Routine Base:  SOR$RO_CODE + 0005
```

```
1 ROUTINE CALC_LRL_OUT: CAL_CTXREG NOVALUE =
1
1 !++
1 !
1 ! FUNCTIONAL DESCRIPTION:
1 !
1 !       Do some processing of the spec tables after the input LRL is known.
1 !       It determines the longest output record length.
1 !
1 ! FORMAL PARAMETERS:
1 !
1 !       NONE
1 !
1 ! IMPLICIT INPUTS:
1 !
1 !       NONE
1 !
1 ! IMPLICIT OUTPUTS:
1 !
1 !       CTX[COM_LRL_OUT]        Longest output record length
1 !       CTX[COM_SPEC_TKS]       Total key size
1 !       CTX[COM_FORMATS]        Number of different record formats
1 !       CTX[COM_VAR]            Flag indicating variable-length records
1 !       FDT[0,FDT_FLD_SIZ]      Input LRL
1 !       KFT[*,KFT_NDE_SIZ]      Input LRL (only those that refer to first FDT)
1 !       KFT[*,KFT_NDE_POS]      Position of field in internal node
1 !       KFT[*,KFT_BUILD]        True if field must be built/copied
1 !
1 ! ROUTINE VALUE:
1 !
1 !       Status code.
1 !
1 ! SIDE EFFECTS:
1 !
1 !       NONE
1 !
1 !--
2     BEGIN
2     EXTERNAL REGISTER
2         CTX =   COM_REG_CTX:    REF BLOCK[CTX_K_SIZE]
2                                 FIELD(CTX_FIELDS);
2     BIND
2         RDT = CTX[COM_RDT_ADR]: REF RDT_TAB[],  ! Record definition table
2         KFT = CTX[COM_KFT_ADR]: REF KFT_TAB[],  ! Key field table
2         FDT = CTX[COM_FDT_ADR]: REF FDT_TAB[],  ! Field definition table
2         CFT = CTX[COM_CFT_ADR]: REF CFT_TAB[];  ! Constant definition table
2
2     LOCAL
2         SEEN: BITVECTOR[KFT_MAX],
2         MAX_DSUM,
2         MAX_KSUM;
2
2
2     ! Store the input LRL in:
2     !   FDT[0,FDT_FLD_SIZ] and KFT[*,KFT_NDE_SIZ] for every KFT entry
2     !   with KFT_CONSTANT = FALSE and KFT_FDT_IDX = 0.
2     !
```

```
;  386            0452  3       BEGIN
;  387            0453  3       LOCAL
;  388            0454  3           KFT_PTR: REF KFT_TAB[];         ! Local pointer to KFT table
;  389            0455  3       FDT[0,FDT_FLD_SIZ] = .CTX[COM_LRL];
;  390            0456  3       KFT_PTR = KFT[0,BASE_];
;  391            0457  3       DECR I FROM .CTX[COM_KFT_SIZ]-1 TO 0 DO
;  392            0458  4           BEGIN
;  393            0459  4           IF NOT .KFT_PTR[0,KFT_CONSTANT] AND .KFT_PTR[0,KFT_FDT_IDX] EQL 0
;  394            0460  4           THEN
;  395            0461  4               KFT_PTR[0,KFT_NDE_SIZ] = .CTX[COM_LRL];
;  396            0462  4           KFT_PTR = KFT_PTR[1,BASE_];
;  397            0463  3           END;
;  398            0464  2       END;
;  399            0465  2
;  400            0466  2
;  401            0467  2       ! Initialize our variables
;  402            0468  2       !
;  403            0469  2       CH$FILL(0, %ALLOCATION(SEEN), SEEN[0]);
;  404            0470  2       MAX_DSUM = 0;
;  405            0471  2       MAX_KSUM = 0;
;  406            0472  2
;  407            0473  2
;  408            0474  2       ! Loop through all record definitions for include statements
;  409            0475  2       !
;  410            0476  2       DECR RDT_IX FROM .CTX[COM_RDT_SIZ]-1 TO 0 DO
;  411            0477  2       IF .RDT[.RDT_IX, RDT_INCLUDE]
;  412            0478  2       THEN
;  413            0479  3           BEGIN
;  414            0480  3           BUILTIN
;  415            0481  3               TESTBITSS;
;  416            0482  3           LOCAL
;  417            0483  3               Z;
;  418            0484  3
;  419            0485  3           ! Have we seen this before?
;  420            0486  3           !
;  421            0487  3           Z = .RDT[.RDT_IX, RDT_KFT_IDX];
;  422            0488  3           IF TESTBITSS(SEEN[.Z])
;  423            0489  3           THEN
;  424            0490  4               BEGIN
;  425          C 0491  4 %(
;  426          C 0492  4               ! Find the RDT entry, and copy relevant information
;  427          C 0493  4               !
;  428          C 0494  4               DECR TMP_IX FROM .CTX[COM_RDT_SIZ]-1 TO 0 DO
;  429          C 0495  4               IF .RDT[.TMP_IX, RDT_INCLUDE]
;  430          C 0496  4               THEN
;  431          C 0497  4                   BEGIN
;  432          C 0498  4                   IF .Z EQL .RDT[.TMP_IX, RDT_KFT_IDX]
;  433          C 0499  4                   THEN
;  434          C 0500  4                       BEGIN
;  435          C 0501  4                       ! currently there's no relevant info to copy
;  436          C 0502  4                       EXITLOOP;
;  437          C 0503  4                       END;
;  438          C 0504  4                   END;
;  439            0505  4 )%
;  440            0506  4               0;
;  441            0507  4               END
;  442            0508  3           ELSE
```

```
BEGIN
LOCAL
    DSUM,                               ! Sum of data lengths
    KSUM,                               ! Sum of key lengths
    KFT_PTR: REF KFT_TAB[];             ! Local pointer to KFT table

! Increment the number of different record formats
!
CTX[COM_FORMATS] = .CTX[COM_FORMATS] + 1;

KFT_PTR = KFT[.Z,BASE_];                ! Pointer to key field entry
DSUM = 0;
KSUM = 0;
IF ONEOF_(.CTX[COM_SORT_TYPE], BMSK_(TYP_K_ADDRESS,TYP_K_INDEX))
THEN
    DSUM = RAB$S_RFA;
WHILE 1 DO
    BEGIN
    LOCAL L;
    L = .KFT_PTR[0, KFT_NDE_SIZ];       ! Get length in bytes
    IF .KFT_PTR[0, KFT_DATA]            ! Data or key?
    THEN
        BEGIN
        IF NOT ONEOF_(.CTX[COM_SORT_TYPE],
            BMSK_(TYP_K_ADDRESS,TYP_K_INDEX))
        THEN
            BEGIN
            KFT_PTR[0, KFT_NDE_POS] = .DSUM;
            DSUM = .DSUM + .L;
            END
        ELSE
            KFT_PTR[0, KFT_BUILD] = FALSE;
        END
    ELSE
        BEGIN
        IF NOT ONEOF_(.CTX[COM_SORT_TYPE],
            BMSK_(TYP_K_ADDRESS,TYP_K_INDEX))
        THEN
            BEGIN
            KFT_PTR[0, KFT_NDE_POS] = .KSUM;
            KSUM = .KSUM + .L;
            END
        ELSE
            BEGIN
            KFT_PTR[0, KFT_NDE_POS] = .DSUM;
            DSUM = .DSUM + .L;
            END;
        END;
    WHILE .KFT_PTR[0,KFT_CONDX] DO  ! ??? Were these ever verified?
        BEGIN
        KFT_PTR = KFT_PTR[1,BASE_];
        KFT_PTR[0, KFT_NDE_POS] = .KFT_PTR[-1, KFT_NDE_POS];
        IF NOT .KFT_PTR[-1, KFT_BUILD]
        THEN
            KFT_PTR[0, KFT_BUILD] = FALSE;
        END;
    IF NOT .KFT_PTR[0,KFT_CONTINUE] THEN EXITLOOP;
```

```
;  500        0566  5                  KFT_PTR = KFT_PTR[1,BASE_];
;  501        0567  4                  END;
;  502        0568  4
;  503        0569  4              ! Store the information for this RDT entry
;  504        0570  4              !
;  505        0571  4              !RDT[.RDT_IX, field] = value;        ! Currently, nothing to store
;  506        0572  4
;  507        0573  4              ! Update MAX_KSUM
;  508        0574  4              !
;  509        0575  4              IF .KSUM GTR .MAX_KSUM THEN MAX_KSUM = .KSUM;
;  510        0576  4
;  511        0577  4              ! Update MAX_DSUM
;  512        0578  4              !
;  513        0579  4              IF .MAX_DSUM EQL 0
;  514        0580  4              THEN
;  515        0581  4                  MAX_DSUM = .DSUM
;  516        0582  4              ELIF .DSUM LSS .MAX_DSUM
;  517        0583  4              THEN
;  518        0584  4                  CTX[COM_VAR] = TRUE
;  519        0585  4              ELIF .DSUM GTR .MAX_DSUM
;  520        0586  4              THEN
;  521        0587  5                  BEGIN
;  522        0588  5                  MAX_DSUM = .DSUM;
;  523        0589  5                  CTX[COM_VAR] = TRUE;        ! Depends on sort process
;  524        0590  5                  END
;  525        0591  3              END;
;  526        0592  2          END;
;  527        0593  2
;  528        0594  2      ! Store the longest output record length, and total key size
;  529        0595  2      !
;  530        0596  2      IF .CTX[COM_RDT_SIZ] GTR 0
;  531        0597  2      THEN
;  532        0598  3          BEGIN
;  533        0599  3          CTX[COM_LRL_OUT]  = .MAX_DSUM;  ! Longest output record length
;  534        0600  3          CTX[COM_SPEC_TKS] = .MAX_KSUM;  ! Total key size
;  535        0601  2          END;
;  536        0602  2
;  537        0603  1      END;



                                         03FC 00000 CALC_LRL_OUT:
                                                          .WORD    Save R2,R3,R4,R5,R6,R7,R8,R9                    ; 0395
                   5E            20   C2 00002            SUBL2    #32, SP                                         ;
                   50     0110   CB   D0 00005            MOVL     272(CTX), R0                                    ; 0455
             04    A0     0084   CB   B0 0000A            MOVW     132(CTX), 4(R0)                                 ;
                   50     0108   CB   D0 00010            MOVL     264(CTX), KFT_PTR                               ; 0456
                   58     00FC   CB   9E 00015            MOVAB    252(CTX), R8                                    ; 0457
                   51       01   A8   9A 0001A            MOVZBL   1(R8), I                                        ;
                                 13   11 0001E            BRB      3$                                              ;
      0B     03    A0            01   E0 00020 1$:        BBS      #1, 3(KFT_PTR), 2$                              ; 0459
                            04   A0   95 00025            TSTB     4(KFT_PTR)                                      ;
                                 06   12 00028            BNEQ     2$                                              ;
             06    A0     0084   CB   B0 0002A            MOVW     132(CTX), 6(KFT_PTR)                            ; 0461
                   50            08   C0 00030 2$:        ADDL2    #8, KFT_PTR                                     ; 0462
```

```
SOR$SPEC_FILE                                                   G 10
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                                 EA            51  F4 00033 3$:     SOBGEQ  I, 1$                                   ; 0457
          20       00            6E            00  2C 00036         MOVC5   #0, (SP), #0, #32, SEEN                 ; 0469
                                               6E     0003B                                                         ;
                                               57  D4 0003C         CLRL    MAX_DSUM                                ; 0470
                                               59  D4 0003E         CLRL    MAX_KSUM                                ; 0471
                                 50            68  9A 00040         MOVZBL  (R8), RDT_IX                            ; 0476
                                             00A1  31 00043 4$:     BRW     16$                                     ;
                   51            50            06  C5 00046 5$:     MULL3   #6, RDT_IX, R1                          ; 0477
                                 51     0104   CB  C0 0004A         ADDL2   260(CTX), R1                            ;
                                 F1            61  E9 0004F         BLBC    (R1), 4$                                ;
                                 51       04   A1  9A 00052         MOVZBL  4(R1), Z                                ; 0487
                   E9            6E            51  E2 00056         BBSS    Z, SEEN, 4$                             ; 0488
                                 55     0080   CB  9E 0005A         MOVAB   128(CTX), R5                            ; 0517
                                          03   A5  96 0005F         INCB    3(R5)                                   ;
                                 51     0108 DB41  7E 00062         MOVAQ   @264(CTX)[Z], KFT_PTR                   ; 0519
                                               53  D4 00068         CLRL    DSUM                                    ; 0520
                                               56  D4 0006A         CLRL    KSUM                                    ; 0521
                   52 18000000   8F       58   AB  78 0006C         ASHL    88(CTX), #402653184, R2                 ; 0522
                                               03  18 00075         BGEQ    6$                                      ;
                                 53            06  D0 00077         MOVL    #6, DSUM                                ; 0524
                                 52       06   A1  3C 0007A 6$:     MOVZWL  6(KFT_PTR), L                           ; 0528
                   0D       03   A1            06  E1 0007E         BBC     #6, 3(KFT_PTR), 7$                      ; 0529
                   54 18000000   8F       58   AB  78 00083         ASHL    88(CTX), #402653184, R4                 ; 0533
                                               15  18 0008C         BGEQ    8$                                      ;
                                               2A  11 0008E         BRB     10$                                     ; 0540
                   54 18000000   8F       58   AB  78 00090 7$:     ASHL    88(CTX), #402653184, R4                 ; 0545
                                               08  19 00099         BLSS    8$                                      ;
                                 61            56  B0 0009B         MOVW    KSUM, (KFT_PTR)                         ; 0548
                                 56            52  C0 0009E         ADDL2   L, KSUM                                 ; 0549
                                               06  11 000A1         BRB     9$                                      ; 0544
                                 61            53  B0 000A3 8$:     MOVW    DSUM, (KFT_PTR)                         ; 0553
                                 53            52  C0 000A6         ADDL2   L, DSUM                                 ; 0554
                   12       03   A1            03  E1 000A9 9$:     BBC     #3, 3(KFT_PTR), 11$                     ; 0557
                                 51            08  C0 000AE         ADDL2   #8, KFT_PTR                             ; 0559
                                 61       F8   A1  B0 000B1         MOVW    -8(KFT_PTR), (KFT_PTR)                  ; 0560
                   EF       FB   A1            04  E0 000B5         BBS     #4, -5(KFT_PTR), 9$                     ; 0561
                            03   A1            10  8A 000BA 10$:    BICB2   #16, 3(KFT_PTR)                         ; 0563
                                               E9  11 000BE         BRB     9$                                      ; 0557
                                 05       03   A1  E9 000C0 11$:    BLBC    3(KFT_PTR), 12$                         ; 0565
                                 51            08  C0 000C4         ADDL2   #8, KFT_PTR                             ; 0566
                                               B1  11 000C7         BRB     6$                                      ; 0525
                                 59            56  D1 000C9 12$:    CMPL    KSUM, MAX_KSUM                          ; 0575
                                               03  15 000CC         BLEQ    13$                                     ;
                                 59            56  D0 000CE         MOVL    KSUM, MAX_KSUM                          ;
                                               57  D5 000D1 13$:    TSTL    MAX_DSUM                                ; 0579
                                               05  12 000D3         BNEQ    14$                                     ;
                                 57            53  D0 000D5         MOVL    DSUM, MAX_DSUM                          ; 0581
                                               0D  11 000D8         BRB     16$                                     ;
                                 57            53  D1 000DA 14$:    CMPL    DSUM, MAX_DSUM                          ; 0582
                                               05  19 000DD         BLSS    15$                                     ;
                                               06  15 000DF         BLEQ    16$                                     ; 0585
                                 57            53  D0 000E1         MOVL    DSUM, MAX_DSUM                          ; 0588
                                 65            02  88 000E4 15$:    BISB2   #2, (R5)                                ; 0589
                                 02            50  F4 000E7 16$:    SOBGEQ  RDT_IX, 17$                             ; 0477
                                               03  11 000EA         BRB     18$                                     ;
                                             FF57  31 000EC 17$:    BRW     5$                                      ;
                                               68  95 000EF 18$:    TSTB    (R8)                                    ; 0596
```

```
                                    09  13 000F1        BEQL    19$                                   ;
                       008A   CB    57  B0 000F3        MOVW    MAX_DSUM, 138(CTX)                    ; 0599
                         5E   AB    59  B0 000F8        MOVW    MAX_KSUM, 94(CTX)                     ; 0600
                                        04 000FC 19$:   RET                                           ; 0603

; Routine Size:  253 bytes,    Routine Base:  SOR$RO_CODE + 0258
```

```
GLOBAL ROUTINE SOR$$SPEC_KEY_SUB: CAL_CTXREG =

!++
!
! FUNCTIONAL DESCRIPTION:
!
!       Process key descriptions from the specification text.
!
! FORMAL PARAMETERS:
!
!       NONE
!
! IMPLICIT INPUTS:
!
!       CTX             Longword pointing to work area (passed in COM_REG_CTX)
!
!       The following fields of the context area are used as input:
!               COM_SORT_TYPE   Type of sort (TYP_K_RECORD, etc)
!               COM_NUM_FILES   Number of input files
!               COM_LRL         Longest input record length (see below)
!               COM_MINVFC      Length of VFC area
!               COM_COLLATE     Collating sequence information
!               COM_STABLE      Flag indicating stable sort
!               COM_VAR         Flag indicating variable-length records
!               COM_NO_DUPS     Flag indicating to delete duplicate records
!
!       The following fields are used as input/output:
!               COM_COMPARE     Comparison routine
!               COM_EQUAL       Equal-key routine
!               COM_TKS         Total key size (hack hack)
!               COM_SPEC_TKS    Total key size, due to record reformatting
!
!       The following fields are used as output:
!               COM_INPUT       Routine to do input conversion of records
!               COM_LENADR      Routine to return length/address of record
!               COM_SRL         Shortest allowable input record length
!               COM_LRL_INT     Length of internal format record
!
! IMPLICIT OUTPUTS:
!
!       NONE
!
! ROUTINE VALUE:
!
!       Status code.
!
! SIDE EFFECTS:
!
!       NONE
!
!--
    BEGIN
    EXTERNAL REGISTER
        CTX =   COM_REG_CTX:    REF BLOCK[CTX_K_SIZE]
                                FIELD(CTX_FIELDS);
    BIND
        RDT = CTX[COM_RDT_ADR]: REF RDT_TAB[],  ! Record definition table
```

```
;  2              KFT = CTX[COM_KFT_ADR]: REF KFT_TAB[],  ! Key field table
;  2              FDT = CTX[COM_FDT_ADR]: REF FDT_TAB[],  ! Field definition table
;  2              CFT = CTX[COM_CFT_ADR]: REF CFT_TAB[];  ! Constant definition table
;  2
;  2      BIND
;  2          UE1 = PLIT BYTE(
;  2              OPC_PUSHL,  M_BD+COM_REG_CTX, %FIELDEXPAND(COM_CTXADR)*%UPVAL,
;  2              OPC_PUSHAB, M_BD+COM_REG_SRC2, OFF_LEN,
;  2              OPC_PUSHAB, M_BD+COM_REG_SRC1, OFF_LEN,
;  2              OPC_PUSHAB, M_BD+COM_REG_SRC2, OFF_ADR,
;  2              OPC_PUSHAB, M_BD+COM_REG_SRC1, OFF_ADR,
;  2              OPC_CALLS, 5, M_AID+R_PC): VECTOR,
;  2          UE2 = PLIT BYTE(
;  2              OPC_BLBC, M_R+R_0, 1,
;  2              OPC_RSB,
;  2              OPC_PUSHL, M_R+R_0,
;  2              OPC_PUSHL, 0,
;  2              OPC_PUSHL, M_AI+R_PC, LONG(SOR$_RTNERROR),
;  2              OPC_CALLS, 3, M_AID+R_PC): VECTOR,
;  2          UE3 = PLIT BYTE(
;  2              OPC_MOVL, SS$_NORMAL, M_R+R_0,
;  2              OPC_RSB): VECTOR,
;  2          UE4 = PLIT BYTE(
;  2              OPC_BLBC, M_R+R_0, 1,
;  2              OPC_RSB,
;  2              OPC_MOVL, 1, M_R+R_0,
;  2              OPC_CMPL,M_BD+COM_REG_SRC1,OFF_STAB,M_BD+COM_REG_SRC2,OFF_STAB,
;  2              OPC_BGTRU, 3,
;  2              OPC_SBWC, 1, M_R+R_0,
;  2              OPC_RSB): VECTOR;
;  2
;  2      ROUTINE APPEND(LEN, ADR): CAL_CTXREG NOVALUE =
;  3          BEGIN
;  3          EXTERNAL REGISTER
;  3              CTX = COM_REG_CTX:  REF BLOCK[CTX_K_SIZE]
;  3                                  FIELD(CTX_FIELDS);
;  3          BIND
;  3              XCODE =         CTX[COM_ROUTINES]: VECTOR[2];
;  3          LOCAL
;  3              DELTA:          VECTOR[2];
;  3          DELTA[0] = .XCODE[0] + .LEN;
;  3          DELTA[1] = SOR$$ALLOCATE(.DELTA[0]);
;  3          CH$MOVE(.LEN, .ADR, CH$MOVE(.XCODE[0], .XCODE[1], .DELTA[1]));
;  3          SOR$$DEALLOCATE(.XCODE[0], XCODE[1]);
;  3          XCODE[0] = .DELTA[0];
;  3          XCODE[1] = .DELTA[1];
;  2          END;


                                              00000006  00355           .LONG   6                                             ;
07 AA 9F 05 A9 9F 05 AA 9F 00 20 00 15  AB   DD  00359 P.AAC:   .BYTE   -35, -85, 21, 0, 32, 0, -97, -86, 5, -97, -  ;
                           9F 05 FB 07  A9   9F  00368                  -87, 5, -97, -86, 7, -97, -87, 7, -5, 5, -   ;
                                                                        -97                                           ;
                                                 0036E          .BLKB   1
                                                 0036F          .BLKB   2
                                              00000005  00371           .LONG   5                                             ;
```

```
                    8F  DD  00  DD  50  DD  05  01  50  E9  00375 P.AAD:   .BYTE   -23, 80, 1, 5, -35, 80, -35, 0, -35, -113   ;
                                              001C812A  0037F          .LONG   1868074
                                                9F  03  FB  00383          .BYTE   -5, 3, -97                                  ;
                                                            00386          .BLKB   1
                                                            00387          .BLKB   2
                                              00000001  00389          .LONG   1                                           ;
                                        05  50  01  D0  0038D P.AAE:   .BYTE   -48, 1, 80, 5                               ;
                                              00000005  00391          .LONG   5
D9  03  1A  00  AA  00  A9  D1  50  01  D0  05  01  50  E9  00395 P.AAF:   .BYTE   -23, 80, 1, 5, -48, 1, 80, -47, -87, 0, -   ;
                                        05  50  01  003A4                  -86, 0, 26, 3, -39, 1, 80, 5                ;
                                                            003A7          .BLKB   2

                                                                  UE1=                     P.AAC
                                                                  UE2=                     P.AAD
                                                                  UE3=                     P.AAE
                                                                  UE4=                     P.AAF


                                                    007C  00000 APPEND:  .WORD   Save R2,R3,R4,R5,R6                           ; 0692
                           5E               04  C2  00002          SUBL2   #4, SP                                        ;
                           56          18   AB  9E  00005          MOVAB   24(CTX), R6                                   ; 0698
                7E         66          04   AC  C1  00009          ADDL3   LEN, (R6), DELTA                              ; 0701
                                            6E  DD  0000E          PUSHL   DELTA                                         ; 0702
                000000000G 00               01  FB  00010          CALLS   #1, SOR$$ALLOCATE                             ;
                        04 AE               50  D0  00017          MOVL    R0, DELTA+4                                   ;
           04   BE      04 B6               66  28  0001B          MOVC3   (R6), @4(R6), @DELTA+4                        ; 0703
                63      08 BC          04   AC  28  00021          MOVC3   LEN, @ADR, (R3)                               ;
                                       04   A6  9F  00027          PUSHAB  4(R6)                                         ; 0704
                                            66  DD  0002A          PUSHL   (R6)                                          ;
                000000000G 00               02  FB  0002C          CALLS   #2, SOR$$DEALLOCATE                           ;
                           66               6E  7D  00033          MOVQ    DELTA, (R6)                                   ; 0705
                                                04  00036          RET                                                   ; 0707

; Routine Size:  55 bytes,    Routine Base:  SOR$RO_CODE + 03A9


;  643          0708  2
;  644          0709  2       BIND
;  645          0710  2           DSC_ADR = VECTOR[CTX[COM_ROUTINES],0],
;  646          0711  2           DSC_LEN = VECTOR[CTX[COM_ROUTINES],1];
;  647          0712  2
;  648          0713  2       LOCAL
;  649          0714  2           ADJ_EQUAL,
;  650          0715  2           ADJ_COMPARE;
;  651          0716  2
;  652          0717  2
;  653          0718  2       ! Determine the longest output record length, COM_LRL_OUT.
;  654          0719  2       ! This also calculates COM_SPEC_TKS and COM_FORMATS.
;  655          0720  2       !
;  656          0721  2       CALC_LRL_OUT();
;  657          0722  2
;  658          0723  2
;  659          0724  2       ! See if we can use SOR$$KEY_SUB to generate the key comparison routines.
;  660          0725  2       ! We can do this if:
;  661          0726  2       !    There is only one record format,
;  662          0727  2       !    There are no conditional keys, and
;  663          0728  2       !    The data is simply the entire record (and not less than the LRL).
```

```
2       !
3       BEGIN LABEL LAB; LAB:
4       BEGIN
4       BUILTIN
4           TESTBITSS,
4           TESTBITCC;
4       LOCAL
4           HAVE_DATA,
4           KEY_BUFF:           KEY_BLOCK,
4           KFT_PTR:            REF KFT_TAB[];              ! Local pointer to KFT table
4
4       IF .CTX[COM_FORMATS] NEQ 1 THEN LEAVE LAB;
4
4       KFT_PTR = KFT[0,BASE_];
4       HAVE_DATA = FALSE;
4       KEY_BUFF[KEY_NUMBER] = 0;                           ! No keys yet
4       DECR I FROM .CTX[COM_KFT_SIZ]-1 TO 0 DO
5           BEGIN
5           IF .KFT_PTR[0,KFT_CONDX] THEN LEAVE LAB;
5           IF .KFT_PTR[0,KFT_DATA]
5           THEN
6               BEGIN
6               IF .KFT_PTR[0,KFT_CONSTANT] THEN LEAVE LAB;
6               IF TESTBITSS(HAVE_DATA) THEN LEAVE LAB;
6               IF .KFT_PTR[0,KFT_NDE_POS] NEQ 0 THEN LEAVE LAB;
6               IF .KFT_PTR[0,KFT_NDE_SIZ] LSS .CTX[COM_LRL] THEN LEAVE LAB;
6               END
5           ELSE
6               BEGIN
6               LOCAL
6                   FDT_PTR:REF FDT_TAB[1],
6                   KBF:     REF KBF_BLOCK;
6               KBF = KEY_BUFF[KEY_KBF(.KEY_BUFF[KEY_NUMBER])];
6               FDT_PTR = FDT[.KFT_PTR[0,KFT_FDT_IDX],BASE_];
6               KBF[KBF_TYPE] =       .FDT_PTR[0,FDT_TYPE];
6               KBF[KBF_LENGTH] =     .FDT_PTR[0,FDT_FLD_SIZ];
6               KBF[KBF_POSITION] =   .FDT_PTR[0,FDT_FLD_POS];
6               KBF[KBF_ORDER] =      .KFT_PTR[0,KFT_DESCEND];
6               KEY_BUFF[KEY_NUMBER] = .KEY_BUFF[KEY_NUMBER] + 1;
5               END;
5           IF NOT .KFT_PTR[0,KFT_CONTINUE]
5           THEN
5               IF TESTBITCC(HAVE_DATA) THEN LEAVE LAB;
5           KFT_PTR = KFT_PTR[1,BASE_];
4           END;
4       RETURN SOR$$KEY_SUB(KEY_BUFF[BASE_]);
3       END;
2       END;
2
2
2       ! If we don't have the data, don't call user-written routines.
2       !
2       IF .CTX[COM_SORT_TYPE] NEQ TYP_K_RECORD
2       THEN
3           BEGIN
3           IF .CTX[COM_COMPARE] NEQ 0 OR .CTX[COM_EQUAL] NEQ 0
3           THEN
```

```
;  721            0786  3                 RETURN SOR$$ERROR(SOR$_BAD_TYPE);
;  722            0787  2             END;
;  723            0788  2
;  724            0789  2
;  725            0790  2         ADJ_EQUAL = FALSE;
;  726            0791  2         ADJ_COMPARE = FALSE;
;  727            0792  2
;  728            0793  2
;  729            0794  2         ! If the user specified his own equal-key routine, call it.
;  730            0795  2         !
;  731            0796  3         BEGIN
;  732            0797  3         SWITCHES UNAMES;
;  733            0798  3         IF .CTX[COM_EQUAL] NEQ 0
;  734            0799  3         THEN
;  735            0800  4             BEGIN
;  736            0801  4             LOCAL
;  737            0802  4                 TMP;
;  738            0803  4             TMP = .DSC_LEN;
;  739            0804  4             APPEND(.UE1[-1], UE1);
;  740            0805  4             APPEND(%UPVAL, CTX[COM_EQUAL]);
;  741            0806  4             APPEND(.UE2[-1], UE2);
;  742            0807  4             APPEND(%UPVAL, %REF(SOR$$ERROR));
;  743            0808  4             APPEND(.UE3[-1], UE3);
;  744            0809  4             CTX[COM_EQUAL] = .TMP;
;  745            0810  4             ADJ_EQUAL = TRUE;
;  746            0811  4             END
;  747            0812  3         ELIF .CTX[COM_NODUPS]
;  748            0813  3         THEN
;  749            0814  4             BEGIN
;  750            0815  4             ROUTINE NODUPS: JSB_EQUAL = SOR$_DELETE2;



                          50 001C8111    8F  D0 00000 ;NODUPS
                                                      U.1:     MOVL     #1868049, R0                              ; 0815
                                             05 00007          RSB                                                ;

; Routine Size:  8 bytes,     Routine Base:  SOR$RO_CODE + 03E0


;  751            0816  4             CTX[COM_EQUAL] = NODUPS;
;  752            0817  4             END
;  753            0818  3         ELSE
;  754            0819  4             BEGIN
;  755            0820  4             !
;  756            0821  4             ! Leave COM_EQUAL equal to 0
;  757            0822  4             !
;  758            0823  4             0;
;  759            0824  3             END;
;  760            0825  2         END;
;  761            0826  2
;  762            0827  2
;  763            0828  2         ! Store the address of the length/address routine
;  764            0829  2         !
;  765            0830  3         BEGIN
;  766          0831  3         ROUTINE LENADR(S: REF VECTOR[,BYTE]; LEN, ADR): JSB_LENADR NOVALUE =
;  767          0832  4             BEGIN
;  768          0833  4             LEN = .(S[OFF_LEN])<0,16,0>;
;  769          0834  4             ADR = S[OFF_ADR];
;  770          0835  3             END;



                                          8A  DF 00000 LENADR: PUSHAL   (R10)+                                  ; 0831
                        50        01     AA  3C 00002         MOVZWL   1(S), LEN                               ; 0833
                        5A                03  C0 00006         ADDL2    #3, ADR                                 ; 0834
                        51                5A  D0 00009         MOVL     R10, R1                                 ; 0835
                        5A                8E  D0 0000C         MOVL     (SP)+, R10                              ;
                                              05 0000F         RSB                                              ;

; Routine Size:  16 bytes,    Routine Base:  SOR$RO_CODE + 03E8

;  771          0836  3         CTX[COM_LENADR] = LENADR;
;  772          0837  2         END;
;  773          0838  2
;  774          0839  2
;  775          0840  2         ! If the user supplied a comparison routine, call it.
;  776          0841  2         !
;  777          0842  2         IF .CTX[COM_COMPARE] NEQ 0
;  778          0843  2         THEN
;  779          0844  3             BEGIN
;  780          0845  3             LOCAL
;  781          0846  3                 TMP;
;  782          0847  3             TMP = .DSC_LEN;
;  783          0848  3             APPEND(.UE1[-1], UE1);
;  784          0849  3             APPEND(%UPVAL, CTX[COM_COMPARE]);
;  785          0850  3             APPEND(.UE4[-1], UE4);
;  786          0851  3             CTX[COM_COMPARE] = .TMP;
;  787          0852  3             ADJ_COMPARE = TRUE;
;  788          0853  3             END
;  789          0854  2         ELSE
;  790          0855  3             BEGIN
;  791          0856  3             CTX[COM_COMPARE] = COMPARE;
;  792          0857  2             END;
;  793          0858  2
;  794          0859  2         ! Store the address of the input reformatting routine
;  795          0860  2         !
;  796          0861  2         CTX[COM_INPUT] = INPUT;
;  797          0862  2
;  798          0863  2
;  799          0864  2         ! Store the length of an internal-format record
;  800          0865  2         !
;  801          0866  3         BEGIN
;  802          0867  3         LOCAL TMP;
;  803          0868  3         CTX[COM_LRL_INT] = TMP =
;  804          0869  3             OFF_ADR +                   ! Offset to start of the data
;  805          0870  3             .CTX[COM_LRL_OUT] +         ! The data
;  806          0871  3             .CTX[COM_SPEC_TKS];         ! The keys
;  807          0872  3         IF .TMP GTR MAX_REFSIZE
;  808          0873  3         THEN
;  809          0874  3             SOR$$ERROR(SOR$_SHR_BADLOGIC);  ! Not really bad logic, just rare.
;  810          0875  2         END;
;  811          0876  2
;  812          0877  2
;  813          0878  2         ! Adjust the actual addresses of the comparison and equal-key routines
;  814          0879  2         !
;  815          0880  2         IF .ADJ_EQUAL   THEN CTX[COM_EQUAL]   = .DSC_ADR + .CTX[COM_EQUAL];
;  816          0881  2         IF .ADJ_COMPARE THEN CTX[COM_COMPARE] = .DSC_ADR + .CTX[COM_COMPARE];
;  817          0882  2
;  818          0883  2
;  819          0884  2         ! Loop through the key field table, adjusting the positions of the fields
;  820          0885  2         ! within the internal format node.
;  821          0886  2         !
;  822          0887  2         DECR Z FROM .CTX[COM_KFT_SIZ]-1 TO 0 DO
;  823          0888  3             BEGIN
;  824          0889  3             LOCAL
;  825          0890  3                 KFT_PTR: REF KFT_TAB[];              ! Local pointer to KFT table
;  826          0891  3             KFT_PTR = KFT[.Z,BASE_];                 ! Pointer to key field entry
;  827          0892  3             IF .KFT_PTR[0, KFT_DATA]
;  828          0893  3             THEN
;  829          0894  3                 KFT_PTR[0, KFT_NDE_POS] = .KFT_PTR[0, KFT_NDE_POS]
;  830          0895  3                     + OFF_ADR
;  831          0896  3             ELIF
;  832        P 0897  3                 NOT ONEOF (.CTX[COM_SORT_TYPE],
;  833          0898  4                     BMSK_(TYP_K_ADDRESS,TYP_K_INDEX))
;  834          0899  3             THEN
;  835          0900  3                 KFT_PTR[0, KFT_NDE_POS] = .KFT_PTR[0, KFT_NDE_POS]
;  836          0901  3                     + OFF_ADR + .CTX[COM_LRL_OUT]
;  837          0902  3             ELSE
;  838          0903  3                 KFT_PTR[0, KFT_NDE_POS] = .KFT_PTR[0, KFT_NDE_POS]
;  839          0904  3                     + OFF_ADR
;  840          0905  2             END;
;  841          0906  2
;  842          0907  2         RETURN TRUE;
;  843          0908  1         END;



                                      07FC 00000          .ENTRY  SOR$$SPEC_KEY_SUB, Save R2,R3,R4,R5,R6,R7,- ; 0604
                                                                  R8,R9,R10                                  ;
                 5A      AC    AF  9E 00002               MOVAB   APPEND, R10                                ;
                 5E    F800    CE  9E 00006               MOVAB   -2048(SP), SP                              ;
                 59    0108    CB  9E 0000B               MOVAB   264(CTX), R9                               ; 0661
                 58    0110    CB  9E 00010               MOVAB   272(CTX), R8                               ; 0662
                 57      18    AB  9E 00015               MOVAB   24(CTX), R7                                ; 0710
                 56      1C    AB  9E 00019               MOVAB   28(CTX), R6                                ; 0711
          FEAF   CA                00  FB 0001D           CALLS   #0, CALC_LRL_OUT                           ; 0721
                 01    0083    CB  91 00022               CMPB    131(CTX), #1                               ; 0740
                         70    12 00027                   BNEQ    6$                                         ;
                 50            69  D0 00029               MOVL    (R9), KFT_PTR                              ; 0742
                               55  D4 0002C               CLRL    HAVE_DATA                                  ; 0743
                         04    AE  B4 0002E               CLRW    KEY_BUFF                                   ; 0744
                 54    00FD    CB  9A 00031               MOVZBL  253(CTX), I                                ; 0745
                               53  11 00036               BRB     5$                                         ;
```

```
                                                   53          03   A0  9E 00038 1$:     MOVAB   3(KFT_PTR), R3                    ; 0747
                                  59               63               03  E0 0003C         BBS     #3, (R3), 6$                      :
                                  16               63               06  E1 00040         BBC     #6, (R3), 2$                      ; 0748
                                  51               63               01  E0 00044         BBS     #1, (R3), 6$                      ; 0751
                                  4D               55               00  E2 00048         BBSS    #0, HAVE_DATA, 6$                 ; 0752
                                                                    60  B5 0004C         TSTW    (KFT_PTR)                         ; 0753
                                                                    49  12 0004E         BNEQ    6$                                :
                                              0084 CB          06   A0  B1 00050         CMPW    6(KFT_PTR), 132(CTX)              ; 0754
                                                                    29  1E 00056         BGEQU   3$                                :
                                                                    3F  11 00058         BRB     6$                                :
                                                   51          04   AE  3C 0005A 2$:     MOVZWL  KEY_BUFF, R1                      ; 0761
                                                   51     06 AE41       7E 0005E         MOVAQ   KEY_BUFF+2[R1], KBF               :
                                                   52          04   A0  9A 00063         MOVZBL  4(KFT_PTR), R2                    ; 0762
                                                   52               06  C4 00067         MULL2   #6, R2                            :
                                                   52               68  C0 0006A         ADDL2   (R8), FDT_PTR                     :
                                                   61               62  9B 0006D         MOVZBW  (FDT_PTR), (KBF)                  ; 0763
                                                04 A1          02   A2  D0 00070         MOVL    2(FDT_PTR), 4(KBF)                ; 0765
                  52              63               01               05  EF 00075         EXTZV   #5, #1, (R3), R2                  ; 0766
                                                02 A1               52  B0 0007A         MOVW    R2, 2(KBF)                        :
                                                               04   AE  B6 0007E         INCW    KEY_BUFF                          ; 0767
                                                   04               63  E8 00081 3$:     BLBS    (R3), 4$                          ; 0769
                                  11               55               00  E5 00084         BBCC    #0, HAVE_DATA, 6$                 ; 0771
                                                   50               08  C0 00088 4$:     ADDL2   #8, KFT_PTR                       ; 0772
                                                   AA               54  F4 0008B 5$:     SOBGEQ  I, 1$                             ; 0745
                                                               04   AE  9F 0008E         PUSHAB  KEY_BUFF                          ; 0774
                                         00000000G 00               01  FB 00091         CALLS   #1, SOR$$KEY_SUB                  :
                                                                        04 00098         RET                                       :
                                                   01          58   AB  91 00099 6$:     CMPB    88(CTX), #1                       ; 0781
                                                                    17  13 0009D         BEQL    8$                                :
                                                                    6B  D5 0009F         TSTL    (CTX)                             ; 0784
                                                                    05  12 000A1         BNEQ    7$                                :
                                                               04   AB  D5 000A3         TSTL    4(CTX)                            :
                                                                    0E  13 000A6         BEQL    8$                                :
                                                         001C806C   8F  DD 000A8 7$:     PUSHL   #1867884                          ; 0786
                                         00000000G 00               01  FB 000AE         CALLS   #1, SOR$$ERROR                    :
                                                                        04 000B5         RET                                       :
                                                                    54  D4 000B6 8$:     CLRL    ADJ_EQUAL                         ; 0790
                                                                    52  D4 000B8         CLRL    ADJ_COMPARE                       ; 0791
                                                               04   AB  D5 000BA         TSTL    4(CTX)                            ; 0798
                                                                    43  13 000BD         BEQL    9$                                :
                                                   53               66  D0 000BF         MOVL    (R6), TMP                         ; 0803
                                                             FE9B   CF  9F 000C2         PUSHAB  UE1                               ; 0804
                                                             FE93   CF  DD 000C6         PUSHL   UE1-4                             :
                                                   6A               02  FB 000CA         CALLS   #2, APPEND                        :
                                                               04   AB  9F 000CD         PUSHAB  4(CTX)                            ; 0805
                                                                    04  DD 000D0         PUSHL   #4                                :
                                                   6A               02  FB 000D2         CALLS   #2, APPEND                        :
                                                             FEA4   CF  9F 000D5         PUSHAB  UE2                               ; 0806
                                                             FE9C   CF  DD 000D9         PUSHL   UE2-4                             :
                                                   6A               02  FB 000DD         CALLS   #2, APPEND                        :
                                                   6E 00000000G     00  9E 000E0         MOVAB   SOR$$ERROR, (SP)                  ; 0807
                                                                    5E  DD 000E7         PUSHL   SP                                :
                                                                    04  DD 000E9         PUSHL   #4                                :
                                                   6A               02  FB 000EB         CALLS   #2, APPEND                        :
                                                             FEA3   CF  9F 000EE         PUSHAB  UE3                               ; 0808
                                                             FE9B   CF  DD 000F2         PUSHL   UE3-4                             :
                                                   6A               02  FB 000F6         CALLS   #2, APPEND                        :
```

```
             04   AB             53  D0 000F9          MOVL    TMP, 4(CTX)                    ; 0809
                  54             01  D0 000FD          MOVL    #1, ADJ_EQUAL                  ; 0810
                                 0A  11 00100          BRB     10$                            ; 0798
       05    5B   AB             05  E1 00102  9$:     BBC     #5, 91(CTX), 10$               ; 0812
             04   AB        37   AA  9E 00107          MOVAB   NODUPS, 4(CTX)                 ; 0816
             10   AB        3F   AA  9E 0010C  10$:    MOVAB   LENADR, 16(CTX)                ; 0836
                                 6B  D5 00111          TSTL    (CTX)                          ; 0842
                                 28  13 00113          BEQL    11$
                  53             66  D0 00115          MOVL    (R6), TMP                      ; 0847
                          FE45   CF  9F 00118          PUSHAB  UE1                            ; 0848
                          FE3D   CF  DD 0011C          PUSHL   UE1-4
                  6A             02  FB 00120          CALLS   #2, APPEND
                                 5B  DD 00123          PUSHL   CTX                            ; 0849
                                 04  DD 00125          PUSHL   #4
                  6A             02  FB 00127          CALLS   #2, APPEND
                          FE6F   CF  9F 0012A          PUSHAB  UE4                            ; 0850
                          FE67   CF  DD 0012E          PUSHL   UE4-4
                  6A             02  FB 00132          CALLS   #2, APPEND
                  6B             53  D0 00135          MOVL    TMP, (CTX)                     ; 0851
                  52             01  D0 00138          MOVL    #1, ADJ_COMPARE                ; 0852
                                 05  11 0013B          BRB     12$                            ; 0842
                  6B     0000V   CF  9E 0013D  11$:    MOVAB   COMPARE, (CTX)                 ; 0856
             08   AB     0000V   CF  9E 00142  12$:    MOVAB   INPUT, 8(CTX)                  ; 0861
                  53      0088   CB  9E 00148          MOVAB   136(CTX), R3                   ; 0868
                  50        02   A3  3C 0014D          MOVZWL  2(R3), R0                      ; 0871
                  51        5E   AB  3C 00151          MOVZWL  94(CTX), R1
                  50             51  C0 00155          ADDL2   R1, R0
                  50             07  C0 00158          ADDL2   #7, TMP                        ; 0870
                  63             50  B0 0015B          MOVW    TMP, (R3)                      ; 0868
         0000FFFF 8F             50  D1 0015E          CMPL    TMP, #65535                    ; 0872
                                 0D  15 00165          BLEQ    13$
                      001C1124   8F  DD 00167          PUSHL   #1839396                       ; 0874
        00000000G 00             01  FB 0016D          CALLS   #1, SOR$$ERROR
                  04             54  E9 00174  13$:    BLBC    ADJ_EQUAL, 14$                 ; 0880
             04   AB             67  C0 00177          ADDL2   (R7), 4(CTX)
                  03             52  E9 0017B  14$:    BLBC    ADJ_COMPARE, 15$               ; 0881
                  6B             67  C0 0017E          ADDL2   (R7), (CTX)
                  51      00FD   CB  9A 00181  15$:    MOVZBL  253(CTX), Z                    ; 0887
                                 28  11 00186          BRB     18$
                  50       00 B941   7E 00188  16$:    MOVAQ   @0(R9)[Z], KFT_PTR             ; 0891
       1B    03   A0             06  E0 0018D          BBS     #6, 3(KFT_PTR), 17$            ; 0892
       52 18000000 8F       58   AB  78 00192          ASHL    88(CTX), #402653184, R2        ; 0898
                                 10  19 0019B          BLSS    17$
                  52             60  3C 0019D          MOVZWL  (KFT_PTR), R2                  ; 0901
                  54        02   A3  3C 001A0          MOVZWL  2(R3), R4
                  52             54  C0 001A4          ADDL2   R4, R2
       60         52             07  A1 001A7          ADDW3   #7, R2, (KFT_PTR)
                                 03  11 001AB          BRB     18$                            ; 0900
                  60             07  A0 001AD  17$:    ADDW2   #7, (KFT_PTR)                  ; 0904
                  D5             51  F4 001B0  18$:    SOBGEQ  Z, 16$                         ; 0892
                  50             01  D0 001B3          MOVL    #1, R0                         ; 0907
                                     04 001B6          RET                                    ; 0908

; Routine Size:  439 bytes,    Routine Base:  SOR$RO_CODE + 03F8
```

```
ROUTINE INPUT
        (
        INPREC: REF VECTOR[2],              ! Length/address of input record
        OUTREC: REF VECTOR[,BYTE]           ! Area for reformatted output record
        ): JSB_INPUT =
!++
!
! FUNCTIONAL DESCRIPTION:
!
!       Reformat an input record.
!
! FORMAL PARAMETERS:
!
!       As described above
!
! IMPLICIT INPUTS:
!
!       CTX             Longword pointing to work area (passed in COM_REG_CTX)
!
! IMPLICIT OUTPUTS:
!
!       NONE
!
! ROUTINE VALUE:
!
!       False iff the record should be dropped from the sort, true otherwise.
!
! SIDE EFFECTS:
!
!       NONE
!
!--
    BEGIN
    EXTERNAL REGISTER
        CTX =   COM_REG_CTX:    REF BLOCK[CTX_K_SIZE]
                                FIELD(CTX_FIELDS);
    REGISTER
        CA =    COM_REG_CTX;

    BIND
        RDT = CTX[COM_RDT_ADR]: REF RDT_TAB[],  ! Record definition table
        KFT = CTX[COM_KFT_ADR]: REF KFT_TAB[],  ! Key field table
        FDT = CTX[COM_FDT_ADR]: REF FDT_TAB[],  ! Field definition table
        CFT = CTX[COM_CFT_ADR]: REF CFT_TAB[];  ! Constant definition table

    EXTERNAL ROUTINE
        SOR$$RDT:       CAL_CTXREG,
        SOR$$REFORM:    CAL_CTXREG;

    LOCAL
        RDTPTR: REF RDT_TAB,
        KFT_IX,
        Z;

    ! Determine the record type
    !
    Z = SOR$$RDT( INPREC[0], RDTPTR );
```

```
;  902        0966  2     SELECTONE .Z OF
;  903        0967  2         SET
;  904        0968  2         [0]:    RETURN FALSE;              ! omit the record
;  905        0969  3         [1]:    BEGIN
;  906        0970  3                 KFT_IX = .RDTPTR[0, RDT_KFT_IDX];
;  907        0971  3                 Z = SOR$$REFORM( INPREC[0], KFT[.KFT_IX,BASE_],
;  908        0972  3                     OUTREC[0], OUTREC[OFF_LEN]);
;  909        0973  3                 IF .Z NEQ 1 THEN (SOR$$ERROR(.Z); RETURN FALSE);
;  910        0974  2                 END;
;  911        0975  2         [OTHERWISE]:
;  912        0976  2                 (SOR$$ERROR(.Z); RETURN FALSE);
;  913        0977  2         TES;
;  914        0978  2
;  915        0979  2     (OUTREC[OFF_FMT])<0,8,0> = .KFT_IX;
;  916        0980  2
;  917        0981  2     IF NOT .CTX[COM_STABLE]
;  918        0982  2     THEN (OUTREC[OFF_STAB])<0,32,0> = 0
;  919        0983  2     ELIF .CTX[COM_MERGE]
;  920        0984  2     THEN (OUTREC[OFF_STAB])<0,32,0> = .CTX[COM_MRG_STREAM]
;  921        0985  2     ELSE (OUTREC[OFF_STAB])<0,32,0> = .CTX[COM_INP_RECNUM];
;  922        0986  2
;  923        0987  3     IF ONEOF_(.CTX[COM_SORT_TYPE], BMSK_(TYP_K_ADDRESS,TYP_K_INDEX))
;  924        0988  2     THEN
;  925        0989  3         BEGIN
;  926        0990  3         CH$MOVE(
;  927        0991  3             RAB$S_RFA,
;  928        0992  3             BLOCK[.CTX[COM_INP_CURR],DDB_RAB+RAB$W_RFA;,BYTE],
;  929        0993  3             OUTREC[OFF_ADR]);
;  930        0994  2         END;
;  931        0995  2
;  932        0996  2     RETURN TRUE;
;  933        0997  2
;  934        0998  1     END;


                                                        .EXTRN  SOR$$RDT, SOR$$REFORM

                5E                04  C2 00000 INPUT:   SUBL2   #4, SP                          ; 0909
                53       0108     CB  9E 00003          MOVAB   264(CTX), R3                    ; 0950
                         4200     8F  BB 00008          PUSHR   #^M<R9,SP>                      ; 0965
        00000000G  00             02  FB 0000C          CALLS   #2, SOR$$RDT                    ;
                                  50  D5 00013          TSTL    Z                               ; 0968
                                  64  13 00015          BEQL    7$                              ;
                01                50  D1 00017          CMPL    Z, #1                           ; 0969
                                  1E  12 0001A          BNEQ    1$                              ;
                51                6E  D0 0001C          MOVL    RDTPTR, R1                      ; 0970
                52         04     A1  9A 0001F          MOVZBL  4(R1), KFT_IX                   ;
                           05     AA  9F 00023          PUSHAB  5(OUTREC)                       ; 0972
                                  5A  DD 00026          PUSHL   OUTREC                          ;
                        00 B342   7F  00028          PUSHAQ  @0(R3)[KFT_IX]                  ; 0971
                                  59  DD 0002C          PUSHL   INPREC                          ; 0972
        00000000G  00             04  FB 0002E          CALLS   #4, SOR$$REFORM                 ;
                01                50  D1 00035          CMPL    Z, #1                           ; 0973
                                  0B  13 00038          BEQL    2$                              ;
                                  50  DD 0003A 1$:      PUSHL   Z                               ; 0976
        00000000G  00             01  FB 0003C          CALLS   #1, SOR$$ERROR                  ;
```

```
                                     36  11 00043          BRB     7$                                   ;
                 04    AA            52  90 00045 2$:      MOVB    KFT_IX, 4(OUTREC)                    ; 0979
                       04      5B    AB  E8 00049          BLBS    91(CTX), 3$                          ; 0981
                                     6A  D4 0004D          CLRL    (OUTREC)                             ; 0982
                                     0F  11 0004F          BRB     5$                                   ;
                               5C    AB  95 00051 3$:      TSTB    92(CTX)                              ; 0983
                                     06  18 00054          BGEQ    4$                                   ;
                       6A      64    AB  D0 00056          MOVL    100(CTX), (OUTREC)                   ; 0984
                                     04  11 0005A          BRB     5$                                   ;
                       6A      7C    AB  D0 0005C 4$:      MOVL    124(CTX), (OUTREC)                   ; 0985
         50 18000000   8F      58    AB  78 00060 5$:      ASHL    88(CTX), #402653184, R0              ; 0987
                                     0B  18 00069          BGEQ    6$                                   ;
                       50    00A0    CB  D0 0006B          MOVL    160(CTX), R0                         ; 0992
      07     AA        24    A0      06  28 00070          MOVC3   #6, 36(R0), 7(OUTREC)                ; 0993
                       50            01  D0 00076 6$:      MOVL    #1, R0                               ; 0996
                                     02  11 00079          BRB     8$                                   ;
                                     50  D4 0007B 7$:      CLRL    R0                                   ; 0998
                       5E            04  C0 0007D 8$:      ADDL2   #4, SP                               ;
                                         05 00080          RSB                                          ;

; Routine Size:  129 bytes,    Routine Base:  SOR$RO_CODE + 05AF
```

```
1 ROUTINE COMPARE
1           (
1           REC1:   REF VECTOR[,BYTE],          ! Address of internal format record
1           REC2:   REF VECTOR[,BYTE]           ! Address of internal format record
1           ): JSB_COMPARE =
1 !++
1 !
1 ! FUNCTIONAL DESCRIPTION:
1 !
1 !         Compare records.
1 !
1 ! FORMAL PARAMETERS:
1 !
1 !         As described above
1 !
1 ! IMPLICIT INPUTS:
1 !
1 !         CTX             Longword pointing to work area (passed in COM_REG_CTX)
1 !
1 ! IMPLICIT OUTPUTS:
1 !
1 !         NONE
1 !
1 ! ROUTINE VALUE:
1 !
1 !         -1 if the first record collates before the second record
1 !          0 if the records collate equal
1 !          1 if the first record collates after the second record
1 !
1 ! SIDE EFFECTS:
1 !
1 !         NONE
1 !
1 !--
2     BEGIN
2     EXTERNAL REGISTER
2         CTX =   COM_REG_CTX:    REF BLOCK[CTX_K_SIZE]
2                                 FIELD(CTX_FIELDS);
2     BIND
2         RDT = CTX[COM_RDT_ADR]: REF RDT_TAB[],  ! Record definition table
2         KFT = CTX[COM_KFT_ADR]: REF KFT_TAB[],  ! Key field table
2         FDT = CTX[COM_FDT_ADR]: REF FDT_TAB[],  ! Field definition table
2         CFT = CTX[COM_CFT_ADR]: REF CFT_TAB[];  ! Constant definition table
2
2     EXTERNAL ROUTINE
2         SOR$$COMPARE:   CAL_CTXREG;             ! aka CA_LINKAGE
2
2     LOCAL
2         KFT1:   REF KFT_TAB,
2         KFT2:   REF KFT_TAB,
2         EOK1,
2         EOK2,
2         S;
2
2     KFT1 = KFT[.REC1[OFF_FMT], BASE_];  ! Get 1st record's KFT pointer
2     KFT2 = KFT[.REC2[OFF_FMT], BASE_];  ! Get 2nd record's KFT pointer
2     EOK1 = FALSE;
```

```
2       EOK2 = FALSE;
2
2       ! While there are more keys
2       !
2       WHILE TRUE DO
3           BEGIN
3           LOCAL
3               FLD1: VECTOR[2],        ! Length/address of field or constant
3               FLD2: VECTOR[2],        ! Length/address of field or constant
3               TYP1,
3               TYP2,
3               FDT_IX;                 ! Index into FDT (or CFT) table
3
3           ! Advance both pointers to the next key description
3           !
3           WHILE 1 DO
4               BEGIN
4               IF NOT .KFT1[0,KFT_CONDX] THEN
4               IF NOT .KFT1[0,KFT_DATA] THEN EXITLOOP;
4               IF NOT .KFT1[0,KFT_CONTINUE] THEN (EOK1 = TRUE; EXITLOOP);
4               KFT1 = KFT1[1,BASE_];
3               END;
3           WHILE 1 DO
4               BEGIN
4               IF NOT .KFT2[0,KFT_CONDX] THEN
4               IF NOT .KFT2[0,KFT_DATA] THEN EXITLOOP;
4               IF NOT .KFT2[0,KFT_CONTINUE] THEN (EOK2 = TRUE; EXITLOOP);
4               KFT2 = KFT2[1,BASE_];
3               END;
3
3           ! The one that runs out of keys first collates less
3           !
3           IF (S = .EOK2 - .EOK1) NEQ 0 THEN RETURN .S;
3           IF .EOK1 THEN EXITLOOP;
3
3
3           FDT_IX = .KFT1[0,KFT_FDT_IDX];
3           IF .KFT1[0,KFT_CONSTANT]
3           THEN
4               BEGIN
4               TYP1 = DSC$K_DTYPE_Z;                   ! Unspecified
4               FLD1[0] = .KFT1[0, KFT_NDE_SIZ]
4               END
3           ELSE
4               BEGIN
4               TYP1 = .FDT[.FDT_IX, FDT_TYPE];
4               IF .TYP1 EQL DSC$K_DTYPE_P
4               THEN
4                   FLD1[0] = .FDT[.FDT_IX, FDT_FLD_SIZ]
4               ELSE
4                   FLD1[0] = .KFT1[0, KFT_NDE_SIZ]
3               END;
3           FLD1[1] = .KFT1[0,KFT_NDE_POS] + REC1[0];
3
3           FDT_IX = .KFT2[0,KFT_FDT_IDX];
3           IF .KFT2[0,KFT_CONSTANT]
3           THEN
```

```
        BEGIN
        TYP2 = .TYP1;                           ! Make it the same as the other
        FLD2[0] = .KFT2[0, KFT_NDE_SIZ];
        END
    ELSE
        BEGIN
        TYP2 = .FDT[.FDT_IX, FDT_TYPE];
        IF .TYP1 EQL DSC$K_DTYPE_Z THEN TYP1 = .TYP2;
        IF .TYP2 EQL DSC$K_DTYPE_P
        THEN
            FLD2[0] = .FDT[.FDT_IX, FDT_FLD_SIZ]
        ELSE
            FLD2[0] = .KFT2[0, KFT_NDE_SIZ]
        END;
    FLD2[1] = .KFT2[0,KFT_NDE_POS] + REC2[0];

    ! If the types are different, simply distinguish the records
    !
    IF (S = .TYP1 - .TYP2) NEQ 0 THEN RETURN SIGN(.S);

    ! If different descending flags, the descending key comes first
    !
    IF (S = .KFT2[0,KFT_DESCEND]-.KFT1[0,KFT_DESCEND]) NEQ 0
        THEN RETURN .S;

    ! Finally, compare the fields
    !
    IF (S = SOR$$COMPARE(.TYP1, FLD1[0], FLD2[0])) NEQ 0 THEN
        IF .KFT1[0,KFT_DESCEND] THEN RETURN -(.S) ELSE RETURN .S;

    ! See whether this record definition is continued
    ! Is this needed???
    !
    IF NOT .KFT1[0,KFT_CONTINUE] THEN EXITLOOP;
    IF NOT .KFT2[0,KFT_CONTINUE] THEN EXITLOOP;

    ! Advance to the next KFT entries
    !
    KFT1 = KFT1[1,BASE_];
    KFT2 = KFT2[1,BASE_];

    END;

! The one that runs out of keys first collates less
!
IF (S = .KFT2[0,KFT_CONTINUE] - .KFT1[0,KFT_CONTINUE]) NEQ 0
    THEN RETURN .S;

IF (S = .(REC1[OFF_STAB]) - .(REC2[OFF_STAB])) NEQ 0
    THEN RETURN SIGN(.S);

RETURN 0;
END;


                                                    .EXTRN  SOR$$COMPARE
```

```
                    5E              10  C2 00000 COMPARE:SUBL2   #16, SP                                  ; 0999
                    50         04   A9  9A 00003          MOVZBL  4(REC1), R0                              ; 1053
                    53       0108 DB40  7E 00007          MOVAQ   @264(CTX)[R0], KFT1
                    50         04   AA  9A 0000D          MOVZBL  4(REC2), R0                              ; 1054
                    52       0108 DB40  7E 00011          MOVAQ   @264(CTX)[R0], KFT2
                                    7E  7C 00017          CLRQ    EOK2                                     ; 1056
          05        03    A3        03  E0 00019 1$:      BBS     #3, 3(KFT1), 2$                          ; 1073
          0F        03    A3        06  E1 0001E          BBC     #6, 3(KFT1), 4$                          ; 1074
                    06         03   A3  E8 00023 2$:      BLBS    3(KFT1), 3$                              ; 1075
          04        AE              01  D0 00027          MOVL    #1, EOK1
                                    05  11 0002B          BRB     4$
                    53              08  C0 0002D 3$:      ADDL2   #8, KFT1                                 ; 1076
                                    E7  11 00030          BRB     1$                                       ; 1071
          05        03    A2        03  E0 00032 4$:      BBS     #3, 3(KFT2), 5$                          ; 1080
          0E        03    A2        06  E1 00037          BBC     #6, 3(KFT2), 7$                          ; 1081
                    05         03   A2  E8 0003C 5$:      BLBS    3(KFT2), 6$                              ; 1082
                    6E              01  D0 00040          MOVL    #1, EOK2
                                    05  11 00043          BRB     7$
                    52              08  C0 00045 6$:      ADDL2   #8, KFT2                                 ; 1083
                                    E8  11 00048          BRB     4$                                       ; 1078
          54        6E         04   AE  C3 0004A 7$:      SUBL3   EOK1, EOK2, S                            ; 1088
                                    03  13 0004F          BEQL    8$
                                  00C9  31 00051          BRW     19$
                    03         04   AE  E9 00054 8$:      BLBC    EOK1, 9$                                 ; 1089
                                  00B1  31 00058          BRW     18$
                    50         04   A3  9A 0005B 9$:      MOVZBL  4(KFT1), FDT_IX                          ; 1092
          04        03    A3        01  E1 0005F          BBC     #1, 3(KFT1), 10$                         ; 1093
                                    55  D4 00064          CLRL    TYP1                                     ; 1096
                                    18  11 00066          BRB     11$                                      ; 1097
          51        50              06  C5 00068 10$:     MULL3   #6, FDT_IX, R1                           ; 1101
                    51       0110   CB  C0 0006C          ADDL2   272(CTX), R1
                    55              61  9A 00071          MOVZBL  (R1), TYP1
                    15              55  D1 00074          CMPL    TYP1, #21                                ; 1102
                                    07  12 00077          BNEQ    11$
          10        AE         04   A1  3C 00079          MOVZWL  4(R1), FLD1                              ; 1104
                                    05  11 0007E          BRB     12$
          10        AE         06   A3  3C 00080 11$:     MOVZWL  6(KFT1), FLD1                            ; 1106
                    51              63  3C 00085 12$:     MOVZWL  (KFT1), R1                               ; 1108
    14    AE        51              59  C1 00088          ADDL3   REC1, R1, FLD1+4
                    50         04   A2  9A 0008D          MOVZBL  4(KFT2), FDT_IX                          ; 1110
          05        03    A2        01  E1 00091          BBC     #1, 3(KFT2), 13$                         ; 1111
                    51              55  D0 00096          MOVL    TYP1, TYP2                               ; 1114
                                    1E  11 00099          BRB     15$                                      ; 1115
                    50              06  C4 0009B 13$:     MULL2   #6, R0                                   ; 1119
                    50       0110   CB  C0 0009E          ADDL2   272(CTX), R0
                    51              60  9A 000A3          MOVZBL  (R0), TYP2
                                    55  D5 000A6          TSTL    TYP1                                     ; 1120
                                    03  12 000A8          BNEQ    14$
                    55              51  D0 000AA          MOVL    TYP2, TYP1
                    15              51  D1 000AD 14$:     CMPL    TYP2, #21                                ; 1121
                                    07  12 000B0          BNEQ    15$
          08        AE         04   A0  3C 000B2          MOVZWL  4(R0), FLD2                              ; 1123
                                    05  11 000B7          BRB     16$
          08        AE         06   A2  3C 000B9 15$:     MOVZWL  6(KFT2), FLD2                            ; 1125
                    50              62  3C 000BE 16$:     MOVZWL  (KFT2), R0                               ; 1127
    0C    AE        50              5A  C1 000C1          ADDL3   REC2, R0, FLD2+4                         ;
```

```
                    54              55           51  C3 000C6            SUBL3   TYP2, TYP1, S                          ; 1131
                                                 5C  12 000CA            BNEQ    21$                                    ;
      54      03    A2              01           05  EF 000CC            EXTZV   #5, #1, 3(KFT2), S                     ; 1135
      50      03    A3              01           05  EF 000D2            EXTZV   #5, #1, 3(KFT1), R0                    ;
                                    54           50  C2 000D8            SUBL2   R0, S                                  ;
                                                 40  12 000DB            BNEQ    19$                                    ;
                                          08     AE  9F 000DD            PUSHAB  FLD2                                   ; 1140
                                          14     AE  9F 000E0            PUSHAB  FLD1                                   ;
                                                 55  DD 000E3            PUSHL   TYP1                                   ;
                         00000000G  00           03  FB 000E5            CALLS   #3, SOR$$COMPARE                       ;
                                    54           50  D0 000EC            MOVL    R0, S                                  ;
                                                 0A  13 000EF            BEQL    17$                                    ;
                    27         03   A3           05  E1 000F1            BBC     #5, 3(KFT1), 19$                       ; 1141
                                    50           54  CE 000F6            MNEGL   S, R0                                  ;
                                                 3E  11 000F9            BRB     23$                                    ;
                                    0D    03     A3  E9 000FB  17$:      BLBC    3(KFT1), 18$                           ; 1146
                                    09    03     A2  E9 000FF            BLBC    3(KFT2), 18$                           ; 1147
                                    53           08  C0 00103            ADDL2   #8, KFT1                               ; 1151
                                    52           08  C0 00106            ADDL2   #8, KFT2                               ; 1152
                                               FF0D  31 00109            BRW     1$                                     ; 1060
      54      03    A2              01           00  EF 0010C  18$:      EXTZV   #0, #1, 3(KFT2), S                     ; 1158
      50      03    A3              01           00  EF 00112            EXTZV   #0, #1, 3(KFT1), R0                    ;
                                    54           50  C2 00118            SUBL2   R0, S                                  ;
                                                 05  13 0011B            BEQL    20$                                    ;
                                    50           54  D0 0011D  19$:      MOVL    S, R0                                  ; 1159
                                                 17  11 00120            BRB     23$                                    ;
                    54              69           6A  C3 00122  20$:      SUBL3   (REC2), (REC1), S                      ; 1161
                                                 0F  13 00126            BEQL    22$                                    ;
                                                 54  D5 00128  21$:      TSTL    S                                      ; 1162
                                                 50  DC 0012A            MOVPSL  R0                                     ;
      50            50              02           02  EF 0012C            EXTZV   #2, #2, R0, R0                         ;
                    50              01           50  C3 00131            SUBL3   R0, #1, R0                             ;
                                                 02  11 00135            BRB     23$                                    ;
                                                 50  D4 00137  22$:      CLRL    R0                                     ; 1164
                                    5E           18  C0 00139  23$:      ADDL2   #24, SP                                ; 1165
                                                     05 0013C            RSB                                            ;

; Routine Size:  317 bytes,    Routine Base:  SOR$RO_CODE + 0630
```

```
1 GLOBAL ROUTINE SOR$$COMPATIBLE(
1         KFT1:    REF KFT_TAB,      ! Address of KFT entry for first key
1         KFT2:    REF KFT_TAB       ! Address of KFT entry for second key
1         ): CAL_CTXREG =
1 !++
1 !
1 ! FUNCTIONAL DESCRIPTION:
1 !
1 !       Determine whether keys are compatible.
1 !
1 ! FORMAL PARAMETERS:
1 !
1 !       As described above
1 !
1 ! IMPLICIT INPUTS:
1 !
1 !       CTX             Longword pointing to work area (passed in COM_REG_CTX)
1 !
1 ! IMPLICIT OUTPUTS:
1 !
1 !       NONE
1 !
1 ! ROUTINE VALUE:
1 !
1 !        0 if the keys are compatible.
1 !       -1 if the keys are incompatible with KFT1 coming first.
1 !        1 if the keys are incompatible with KFT2 coming first.
1 !
1 ! SIDE EFFECTS:
1 !
1 !       NONE
1 !
1 !--
2     BEGIN
2     EXTERNAL REGISTER
2         CTX =   COM_REG_CTX:     REF BLOCK[CTX_K_SIZE]
2                                  FIELD(CTX_FIELDS);
2     BIND
2         FDT = CTX[COM_FDT_ADR]: REF FDT_TAB[];  ! Field definition table
2
2     LOCAL
2         FDT_IX,
2         FLD1_TYP:       BYTE,
2         FLD2_TYP:       BYTE,
2         FLD1_LEN:       WORD,
2         FLD2_LEN:       WORD,
2         FLD1_SCA:       BYTE,
2         FLD2_SCA:       BYTE,
2         S;
2
2     FDT_IX = .KFT1[0,KFT_FDT_IDX];
2     IF .KFT1[0,KFT_CONSTANT]
2     THEN
3         BEGIN
3         FLD1_TYP = DSC$K_DTYPE_Z;
3         FLD1_LEN = .KFT1[0, KFT_NDE_SIZ];
3         FLD1_SCA = 0;
```

```
3              END
2          ELSE
3              BEGIN
3              FLD1_TYP = .FDT[.FDT_IX, FDT_TYPE];
3              IF .FLD1_TYP EQL DSC$K_DTYPE_P
3              THEN
3                  FLD1_LEN = .FDT[.FDT_IX, FDT_FLD_SIZ]
3              ELSE
3                  FLD1_LEN = .KFT1[0, KFT_NDE_SIZ];
3              FLD1_SCA = .FDT[.FDT_IX, FDT_SCALE];
2              END;
2
2          FDT_IX = .KFT2[0,KFT_FDT_IDX];
2          IF .KFT2[0,KFT_CONSTANT]
2          THEN
3              BEGIN
3              FLD2_TYP = .FLD1_TYP;
3              FLD2_LEN = .KFT2[0, KFT_NDE_SIZ];
3              FLD2_SCA = 0;
3              END
2          ELSE
3              BEGIN
3              FLD2_TYP = .FDT[.FDT_IX, FDT_TYPE];
3              IF .FLD1_TYP EQL DSC$K_DTYPE_Z THEN FLD1_TYP = .FLD2_TYP;
3              IF .FLD2_TYP EQL DSC$K_DTYPE_P
3              THEN
3                  FLD2_LEN = .FDT[.FDT_IX, FDT_FLD_SIZ]
3              ELSE
3                  FLD2_LEN = .KFT2[0, KFT_NDE_SIZ];
3              FLD2_SCA = .FDT[.FDT_IX, FDT_SCALE];
2              END;
2
2
2          ! If the types are different, simply distinguish the records
2          !
2          IF (S = .FLD1_TYP - .FLD2_TYP) NEQ 0 THEN RETURN SIGN(.S);
2
2
2          ! Check the lengths
2          !
2          IF .FLD1_TYP NEQ DSC$K_DTYPE_T AND .FLD1_TYP NEQ DSC$K_DTYPE_Z
2          THEN
2              IF (S = .FLD1_LEN - .FLD2_LEN) NEQ 0 THEN RETURN SIGN(.S);
2
2
2          ! Check the scales
2          !
2          IF (S = .FLD1_SCA - .FLD2_SCA) NEQ 0 THEN RETURN SIGN(.S);
2
2
2          ! If different descending flags, the descending key comes first
2          !
2          IF (S = .KFT2[0,KFT_DESCEND]-.KFT1[0,KFT_DESCEND]) NEQ 0
2              THEN RETURN .S;
2
2
2          ! The fields are compatible
```

```
; 1218          1280  2       !
; 1219          1281  2       RETURN 0;
; 1220          1282  1       END;



                                        03FC 00000          .ENTRY   SOR$$COMPATIBLE, Save R2,R3,R4,R5,R6,R7,R8,-; 1166
                                                                     R9                                          :
                        53      04  AC   D0 00002           MOVL     KFT1, R3                                    ; 1216
                        50      04  A3   9A 00006           MOVZBL   4(R3), FDT_IX                               :
          0A      03    A3          01   E1 0000A           BBC      #1, 3(R3), 1$                               ; 1217
                                    54   94 0000F           CLRB     FLD1_TYP                                    ; 1220
                        57      06  A3   B0 00011           MOVW     6(R3), FLD1_LEN                             ; 1221
                                    58   94 00015           CLRB     FLD1_SCA                                    ; 1222
                                    1F   11 00017           BRB      4$                                          ; 1217
          51            50          06   C5 00019 1$:       MULL3    #6, FDT_IX, R1                              ; 1226
                        51    0110  CB   C0 0001D           ADDL2    272(CTX), R1                                :
                        54          61   90 00022           MOVB     (R1), FLD1_TYP                              :
                        15          54   91 00025           CMPB     FLD1_TYP, #21                               ; 1227
                                    06   12 00028           BNEQ     2$                                          :
                        57      04  A1   B0 0002A           MOVW     4(R1), FLD1_LEN                             ; 1229
                                    04   11 0002E           BRB      3$                                          :
                        57      06  A3   B0 00030 2$:       MOVW     6(R3), FLD1_LEN                             ; 1231
                        58      01  A1   90 00034 3$:       MOVB     1(R1), FLD1_SCA                             ; 1232
                        52      08  AC   D0 00038 4$:       MOVL     KFT2, R2                                    ; 1235
                        50      04  A2   9A 0003C           MOVZBL   4(R2), FDT_IX                               :
          0B      03    A2          01   E1 00040           BBC      #1, 3(R2), 5$                               ; 1236
                        51          54   90 00045           MOVB     FLD1_TYP, FLD2_TYP                          ; 1239
                        55      06  A2   B0 00048           MOVW     6(R2), FLD2_LEN                             ; 1240
                                    56   94 0004C           CLRB     FLD2_SCA                                    ; 1241
                                    25   11 0004E           BRB      9$                                          ; 1236
                        50          06   C4 00050 5$:       MULL2    #6, R0                                      ; 1245
                        50    0110  CB   C0 00053           ADDL2    272(CTX), R0                                :
                        51          60   90 00058           MOVB     (R0), FLD2_TYP                              :
                                    54   95 0005B           TSTB     FLD1_TYP                                    ; 1246
                                    03   12 0005D           BNEQ     6$                                          :
                        54          51   90 0005F           MOVB     FLD2_TYP, FLD1_TYP                          :
                        15          51   91 00062 6$:       CMPB     FLD2_TYP, #21                               ; 1247
                                    06   12 00065           BNEQ     7$                                          :
                        55      04  A0   B0 00067           MOVW     4(R0), FLD2_LEN                             ; 1249
                                    04   11 0006B           BRB      8$                                          :
                        55      06  A2   B0 0006D 7$:       MOVW     6(R2), FLD2_LEN                             ; 1251
                        56      01  A0   90 00071 8$:       MOVB     1(R0), FLD2_SCA                             ; 1252
                        50          54   9A 00075 9$:       MOVZBL   FLD1_TYP, S                                 ; 1258
                        59          51   9A 00078           MOVZBL   FLD2_TYP, R9                                :
                        50          59   C2 0007B           SUBL2    R9, S                                       :
                                    1F   12 0007E           BNEQ     11$                                         :
                        0E          54   91 00080           CMPB     FLD1_TYP, #14                               ; 1263
                                    0F   13 00083           BEQL     10$                                         :
                                    54   95 00085           TSTB     FLD1_TYP                                    :
                                    0B   13 00087           BEQL     10$                                         :
                        50          57   3C 00089           MOVZWL   FLD1_LEN, S                                 ; 1265
                        51          55   3C 0008C           MOVZWL   FLD2_LEN, R1                                :
                        50          51   C2 0008F           SUBL2    R1, S                                       :
                                    0B   12 00092           BNEQ     11$                                         :
                                      50          58  9A 00094 10$:      MOVZBL  FLD1_SCA, S                              ; 1270
                                      51          56  9A 00097           MOVZBL  FLD2_SCA, R1
                                      50          51  C2 0009A           SUBL2   R1, S
                                                  11  13 0009D           BEQL    12$
                                                  50  D5 0009F 11$:      TSTL    S
                                                  51  DC 000A1           MOVPSL  R1
        51              51            02          02  EF 000A3           EXTZV   #2, #2, R1, R1
                        51            01          51  C3 000A8           SUBL3   R1, #1, R1
                                      50          51  D0 000AC           MOVL    R1, R0
                                                  04     000AF           RET
        50        03    A2            01          05  EF 000B0 12$:      EXTZV   #5, #1, 3(R2), S                         ; 1275
        51        03    A3            01          05  EF 000B6           EXTZV   #5, #1, 3(R3), R1
                                      50          51  C2 000BC           SUBL2   R1, S
                                                  02  12 000BF           BNEQ    13$
                                                  50  D4 000C1           CLRL    R0                                       ; 1281
                                                  04     000C3 13$:      RET                                              ; 1282

; Routine Size:  196 bytes,    Routine Base:  SOR$RO_CODE + 076D
; 1222          1283  1 ROUTINE CLEAN_UP: CAL_CTXREG NOVALUE =
; 1223          1284  1
; 1224          1285  1 !++
; 1225          1286  1 !
; 1226          1287  1 ! FUNCTIONAL DESCRIPTION:
; 1227          1288  1 !
; 1228          1289  1 !       Release resources allocated by this module.
; 1229          1290  1 !
; 1230          1291  1 ! FORMAL PARAMETERS:
; 1231          1292  1 !
; 1232          1293  1 !       NONE
; 1233          1294  1 !
; 1234          1295  1 ! IMPLICIT INPUTS:
; 1235          1296  1 !
; 1236          1297  1 !       NONE
; 1237          1298  1 !
; 1238          1299  1 ! IMPLICIT OUTPUTS:
; 1239          1300  1 !
; 1240          1301  1 !       NONE
; 1241          1302  1 !
; 1242          1303  1 ! ROUTINE VALUE:
; 1243          1304  1 !
; 1244          1305  1 !       NONE (signals errors)
; 1245          1306  1 !
; 1246          1307  1 ! SIDE EFFECTS:
; 1247          1308  1 !
; 1248          1309  1 !       NONE
; 1249          1310  1 !
; 1250          1311  1 !--
; 1251          1312  2     BEGIN
; 1252          1313  2     EXTERNAL REGISTER
; 1253          1314  2         CTX =   COM_REG_CTX:     REF CTX_BLOCK;
; 1254          1315  2     IF .CTX[COM_WRK_ADR] NEQ 0 AND .CTX[COM_WRK_END] NEQ 0
; 1255          1316  2     THEN
; 1256          1317  3         BEGIN
; 1257          1318  3         CTX[COM_WRK_ADR] = .CTX[COM_WRK_END] - .CTX[COM_WRK_SIZ];
; 1258          1319  3         SOR$$DEALLOCATE(.CTX[COM_WRK_SIZ], CTX[COM_WRK_ADR]);
; 1259          1320  2         END;
; 1260          1321  1     END;



                                          0000 00000 CLEAN_UP:
                                                           .WORD   Save nothing                        ; 1283
                    50       0128    CB  9E 00002          MOVAB   296(CTX), R0                        ; 1315
                                     60  D5 00007          TSTL    (R0)                                ;
                                     1B  13 00009          BEQL    1$                                  ;
                             012C    CB  D5 0000B          TSTL    300(CTX)                            ;
                                     15  13 0000F          BEQL    1$                                  ;
        60      012C    CB   0124    CB  C3 00011          SUBL3   292(CTX), 300(CTX), (R0)            ; 1318
                                     50  DD 00019          PUSHL   R0                                  ; 1319
                             0124    CB  DD 0001B          PUSHL   292(CTX)                            ;
          00000000G  00              02  FB 0001F          CALLS   #2, SOR$$DEALLOCATE                 ;
                                         04 00026 1$:      RET                                         ; 1321
```

```
; Routine Size:  39 bytes,    Routine Base:  SOR$RO_CODE + 0831

; 1261          1322  1
; 1262          1323  1 END
; 1263          1324  0 ELUDOM



;                                       PSECT SUMMARY
;
;       Name                            Bytes                   Attributes
;
;   SOR$RO_CODE___________________2         4  NOVEC,NOWRT,  RD ,  EXE,  SHR,  LCL,  REL,  CON,  PIC,ALIGN(2)
;   SOR$RO_CODE                          2136  NOVEC,NOWRT,  RD ,  EXE,  SHR,  LCL,  REL,  CON,  PIC,ALIGN(2)
;   .  ABS  .                               0  NOVEC,NOWRT,NORD ,NOEXE,NOSHR,  LCL,  ABS,  CON,NOPIC,ALIGN(0)



;                               Library Statistics
;
;                                                -------- Symbols --------        Pages        Processing
;       File                                     Total    Loaded   Percent       Mapped       Time
;
;   _$255$DUA28:[SYSLIB]STARLET.L32;1             9776       109         1          581         00:01.0
;   _$255$DUA28:[SORT32.SRC]SORLIB.L32;1           409       151        36           34         00:00.4
;   _$255$DUA28:[SORT32.SRC]SRTSPC.L32;1           120        20        16           12         00:00.1
;   _$255$DUA28:[SORT32.SRC]OPCODES.L32;1          343        15         4           18         00:00.4



;                                       COMMAND QUALIFIERS

;       BLISS/CHECK=(FIELD,INITIAL,OPTIMIZE)/NOTRACE/LIS=LIS$:SORSPEC/OBJ=OBJ$:SORSPEC MSRC$:SORSPEC/UPDATE=(ENH$:SORSPEC)

; Size:          2047 code + 93 data bytes
; Run Time:         00:45.3
; Elapsed Time:     02:32.2
; Lines/CPU Min:     1754
; Lexemes/CPU-Min: 27070
; Memory Used:   262 pages
; Compilation Complete
```

0366 AH-BT13A-SE
VAX/VMS V4.0

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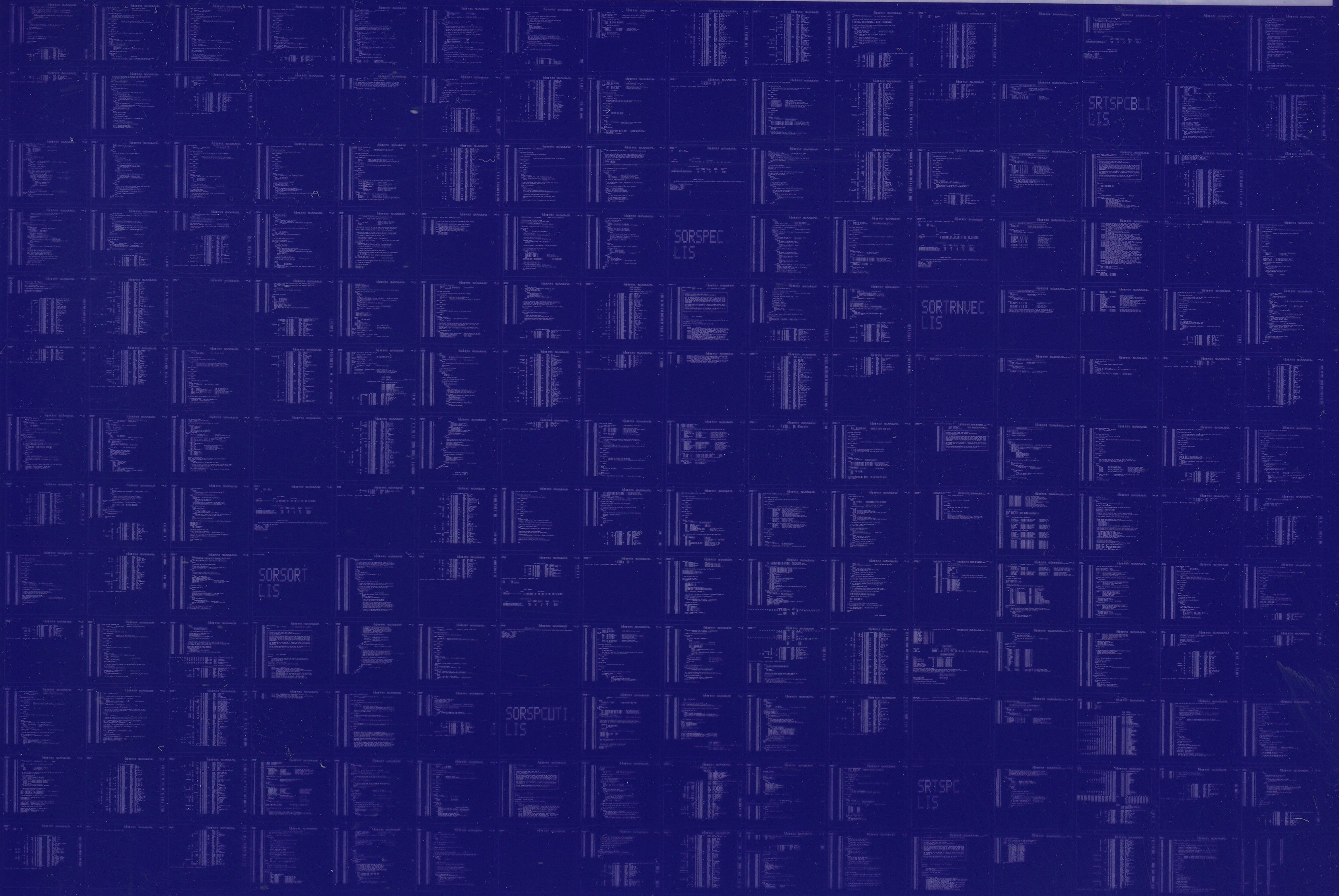

SRTSPCBLI
LIS

SORSPEC
LIS

SORTRNVEC
LIS

SORSORT
LIS

SORSPCUTI
LIS

SRTSPC
LIS